GENERAL LIBRARY,
UNIV. OF MICH.
OCT 18 1904

THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII CLEVELAND, OHIO, OCTOBER 13, 1904 NUMBER 41

HARDWOOD TIMBER ALONG LOGGING SPUR.
HARDWOOD TIMBER FOR CHARCOAL
A CHARCOAL FURNACE
CHARCOAL FURNACE ON LINE OF W.C.R.
GROUP OF RECENTLY CONSTRUCTED RETORTS ON LINE OF W.C.RY.

Opportunities
for
CHARCOAL RETORTS
and
CHARCOAL FURNACES

In Northern Wisconsin on the line of the Wisconsin Central Railway, and in direct connection with the iron mines of the Gogebic Iron Range are large tracts of hardwood timber. Lumber Companies are building spurs into this timber and removing the hemlock and such of the hardwood as is of sufficient dimension. After this cutting there still remain large quantities of maple and birch admirably adapted for charcoal purposes and easily accessible through the railroad spurs and logging roads that have been built to remove the saw timber. Excellent opportunities are here offered for charcoal retorts and charcoal furnaces.
For further information address

WM. H. KILLEN, Industrial Com'r
Wisconsin Central Ry.
MILWAUKEE, WIS.

CHICAGO DROP FORGE & FDRY. CO.

WORKS ESTABLISHED 1880

DROP FORGINGS

OF ALL KINDS

KENSINGTON, ILLS.

38 minutes South of Chicago by Ills. Central R. R. Suburban trains.

Fire Brick, Fire Clay, Pig Iron. *P. B. STEVENS, Detroit, Mich.*

Steel and Malleable Castings

True to pattern. Quality unsurpassed. Steel will harden like tool steel.

Acme Steel & Malleable Iron Works

BUFFALO, N. Y.

TURNBUCKLES

CLEVIS NUTS

CLEVELAND CITY FORGE & IRON CO.

CLEVELAND, OHIO.

MEADVILLE MALLEABLE IRON CO.,

MEADVILLE, PA.

MALLEABLE CASTINGS of any description.

SATISFACTION GUARANTEED.

F. A. EMMERTON,

Chemist, Assayer and Metallurgist.

Ores sampled at lake ports, mines and furnaces. Mines and Metallurgical Processes Examined. Analyses made of Ores, Metals, Fuels, Railroad and Foundry Supplies, etc.

9 Bratenahl Building, CLEVELAND, O.

AIR COMPRESSORS CATALOGUE GRATIS

AMERICAN AIR COMPRESSOR WORKS

NO. 20 CORTLANDT ST., NEW YORK

The Canton Malleable Iron Co.

MALLEABLE CASTINGS OF ALL KINDS.

CANTON, OHIO.

OIL BURNING FURNACE No. 11. herewith illustrated, has an opening 14 x 2½ inches.

OIL for FUEL

A successful system of burning oil for forging, annealing, hardening or heating iron, steel, etc.

25% SAVING OVER COAL OR COKE

Oil vaporized with a blast furnished from a fan, blower or steam pipe. Oil Burners, Forges and Crucible Furnaces. Write for Catalog.

Union Drop Forge Co.

68-70 E. Ohio St., CHICAGO, ILL.

STEEL FORGINGS ALL SHAPES

MARINE MACHINE RAILROAD

Heavy Shafting in the rough, rough turned or finished

TINDEL-MORRIS COMPANY

Eddystone, Pa.

INGERSOLL-SERGEANT MACHINERY

Selected to drive the PENNSYLVANIA RAILROAD TUNNELS under the Hudson and East Rivers

THE O'ROURKE ENGINEERING AND CONSTRUCTION CO. will use 8 Corliss Compressors. S. PEARSON AND SON, Inc., will use 12 Corliss Compressors

THE **INGERSOLL-SERGEANT** DRILL CO.

Chicago, Ill. Cleveland, O. St. Louis, Mo.

14

26 CORTLANDT STREET NEW YORK

Philadelphia, Pa. Pittsburg, Pa. Boston, Mass.

IMPERIAL

Riveters and Chippers and Air Hoists.

NEW CIRCULAR NO. 14 JUST OUT.

IMPERIAL

Piston Drills and Wood Borers.

RAND DRILL CO.

128 Broadway New York.

Write for Prices.

THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, OCTOBER 13, 1904 NUMBER 41

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The strengthening and broadening process in the iron market has gone farther in the past week. As in all such movements there is the constant necessity of sifting the genuine from the spurious in the indiscriminate proclamations of improvement that are circulated. And there is now the further difficulty that iron market improvement was so enthusiastically announced from Wall Street for weeks before it came, that the actual thing is even yet scarcely up to the promises of the summer. A good deal has been made in the week, of the advance of 50 cents in Southern iron, bringing No. 2 foundry up to $10 Birmingham; but this is the result of the curtailment of production by the Alabama coal strike and not an index of the general market. It indicates the reduction of accumulated stocks of pig iron in the South and is given emphasis by the temporary withdrawal of two large producers from the market. On the other hand the advance has led to the withdrawal of business from Southern furnaces, for Northern iron in the Central West can be had at more than $1 a ton below the delivered price of Southern iron. With the starting of more Southern furnaces, as is expected on further improvement in the labor situation, the maintenance of the $10 level is open to question. Pipe works have been in the market in the past week, their immediate wants amounting to 25,000 tons, and there has been continued inquiry for foundry iron—in round lots in some cases—but the buying has not been up to that of the second half of September.

Production of steel-making pig iron is on a scale approaching that of the early spring, but there are indications that the furnace operations of large interests will be on a lessened scale in the closing months of the year. The basic pig iron market has reflected the increased activity of open-hearth steel plants, and the price has advanced 25 to 50 cents above recent low point. Bessemer iron is firmer, also, where furnaces are dealt with, but dealers who bought at the low level are underbidding producers. The Steel Corporation has 82 percent of its blast furnaces active, leaving out of the account furnaces that have never been in blast.

Vessel building at lake shipyards has been a commanding factor of interest in the finished material market. For the 13 freight steamers booked within the past month more than 30,000 tons of steel will be required and there are important negotiations pending which are expected to add to the list of new freighters for next year. The Steel Corporation's decision as to its new vessel program is expected to be given this week. Railroads are making a fair beginning in car buying, contracts of the past week amounting to several thousand. At the low prices now named both for steel and wooden cars it is to be expected that liberal orders will be given out and that car works will have a busy winter. Structural mills are better employed than at any time in the year, but few large contracts are announced for the week, apart from Pittsburg, where one contracting firm is in the market for 5,000 tons for buildings in Baltimore and New York.

The rail situation will be canvassed at a meeting of manufacturers early in November. The reduction to $24 talked of by the railroads would be in line with other recent reductions, but relation to other materials has not generally been influential in fixing rail prices. Rail mills have booked fair orders recently and light rail business has been better than that for standard sections. A change in the attitude of the railroads toward the iron market is certainly due and its coming will greatly reinforce the improvement thus far made. The week has changed any lingering doubt as to crop results to assurance, and both railroad and agricultural works buyers have the warrant to go forward.

It is to be said that the new business now going on the books of the mills is for actual consumptive needs. Nothing has been seen as yet of buying for the replenishment of stocks in jobbers' and consumers' hands. Should such a movement come it would doubtless repeat what has often been seen when many buyers enter the market at once. Clearer assurance than exists as to the buying power of ultimate consumers must precede such a movement. There is still a large unemployed capacity and that which is active is kept busy in part by foreign demand. Recently foreign business has been rather quieter, a condition at variance with currently reported advances on export steel. For domestic billets and sheet bars there is considerable inquiry for the next three and six months, and some shading of official prices.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Oct. 12.

General conditions continue favorable, and while buying has not been nearly as heavy in this market during the past week as in recent weeks, either in pig iron or steel, the opinion continues to prevail that the entire market is on a better basis. There will be no heavy purchases of iron in this market for several months, as all the large consumers have covered their requirements until the end of the year, but the occasional orders received from small foundries and rolling mills indicate an increase in demand for finished material. The heavy buying of foundry and forge iron has filled up the order books of several stacks in the Valleys until the end of the year, and the furnaces now seeking tonnage are attempting to do so at greater advances than buyers will pay. As a result there is a wide margin between the asking and selling price. Improvement in prices promises to be slow on account of the idle capacity that will come in as soon as better prices are prevailing, and in addition the increase in producing capacity is still far beyond the country's normal demand. While Valley stacks are attempting to secure as high as $12.25 at the furnace for Bessemer, sales have been made as low as $11.75 during the week, and $12 is the high point. These low prices are being named by brokers that have secured speculative iron earlier in the year at lower prices and are willing to sell at the small profit which such sales will realize. On No. 2 foundry the general market is $12.85, Pittsburg, although it is possible that small lots could be placed for prompt shipment at slight concessions. On basic iron $11.75 at the furnace can be done for delivery to the end of the year. Southern irons have been advanced 50 cents a ton, and several Southern producers have nothing to offer in the way of foundry and forge until after the first of the year. Blast furnace operations show improvement, the United States Steel Corporation having 82 percent of its capacity in operation at present, while two independent stacks, now idle, will come in by the first of next month, and one idle stack at Kittanning was blown in this week. One Mingo Junction furnace has gone out and the steel works there are still idle.

In finished lines, sheets show the most marked improvement and it is practically impossible to shade 2.10c. Demand for skelp is also heavy and slightly better prices are being secured. Pipe on the other hand shows no improvement, and the time for a heavy fall buying movement has passed. The tin plate market continues weak and prices are still shaded. Demand for billets is improving, consumers figuring on their requirements for the next six months. One local producer will not sell beyond the first of the year, but other steel manu-

facturers are willing to close at today's prices for advanced deliveries and considerable business is pending. Concessions from the official prices, ranging from 25 to 50 cents a ton, are being made, and the names of mills in the association are connected with the cuts. Some of the independent mills have gone as much as 75 cents a ton below the schedule. That these prices would be shaded was expected, but the price is now so low, considering the present cost basis, that any great cut is practically impossible without loss.

The Lackawanna Steel Co. this week negotiated for the purchase of 900 tons of coke daily for delivery the remainder of the year, and it is possible that late in November 1,600 tons daily will be required when additional furnace capacity is in operation. This company owns a large acreage of coal land in Indiana county, but it has been found that washing will be necessary to eliminate the sulphur. As a result the by-product ovens will remain idle temporarily and coke will be shipped from this district until a washer can be installed. In addition 1,000 tons of coal daily will be purchased for operating the gas producers. Coke prices, despite this large purchase, show little improvement, although producers are not willing to close on furnace coke for the first half of next year below $1.50.

Pig Iron.—Sales of pig iron during the week aggregated about 5,000 tons, mostly in hundred-ton, with one or two thousand-ton lots. Forge iron is firm at $12, Pittsburg, while No. 2 foundry is now established on a basis of $12.85. Bessemer iron continues weak, and while producers would like to secure $12.25 at the furnace, most of the sales for future delivery are being made on the basis of $12 at the furnace. One lot of 200 tons for prompt delivery was sold at $11.75, and while this price can hardly be duplicated, $12 can be shaded for immediate shipment. Large blocks of speculative Bessemer are held by brokers, most of it purchased at $11.50 at the furnace, and they are willing to shade $12 to dispose of their holdings. Southern iron is now quoted at $10 Birmingham for No. 2, while one or two stacks are asking $10.25. Most of the furnaces are sold up until the end of the year, but this advance is only possible owing to the idleness of so many stacks in that district due to the coal strike. On Oct. 1 the United States Steel Corporation had 62 of its 81 furnaces in operation, and out of a total daily capacity of 39,389 tons, 34,162 was in operation. The active capacity was thus 82 percent. Out of a total of 192 furnaces using Lake Superior ores, 129 were in operation on the first of the month, the idle capacity being only 26 percent. On Sept. 1 the idle capacity was 28 percent. These furnaces are capable of 55,300 tons output a day, and the active capacity amounted to 41,174 tons. The Bessemer Furnace Association had 10 of its 16 furnaces in operation, and it is probable that the number of idle stacks will be reduced within the next three or four weeks. The Cherry Valley Iron Co. will probably blow in its rebuilt stack at Leetonia on Nov. 1, while the La Belle Iron Works is preparing to blow in its second furnace on Oct. 24. The Kittanning Iron & Steel Co. blew in its idle stack at Kittanning, Pa., this week. Last week the Carnegie Steel Co. placed another one of its idle stacks at the Edgar Thomson plant in operation, although one furnace at Mingo Junction was blown out, which offsets this increase. The Edith furnace of the American Steel & Wire Co., Allegheny, will be blown in shortly. We revise quotations as follows:

Bessemer, Valley	$11 85 to 12 00
Bessemer, Pittsburg	12 70 to 12 85
No. 1 Foundry	13 00 to 13 25
No. 2 Foundry	12 70 to 12 85
Gray forge, Pittsburg	12 00 to 12 10
Chilled basic, Valley	11 75 to 11 85
Chilled basic, Pittsburg	12 60 to 12 70

Steel.—Quotations on billets are again being shaded from 25 to 50 cents a ton, and by a few independent producers as much as 75 cents. Demand for billets is improving materially and large buyers are endeavoring to cover three to six months' requirements. One local producer will not sell beyond the first of the year, and it is doubtful if any large tonnage of steel could be placed below the association quotations, although it is possible to do so on small lots for prompt delivery. We make the following quotations: Bessemer and open-hearth billets, 4 x 4 in., and slabs, up to and including 0.25 carbon, $19.50, f. o. b. mill, Pittsburg, with actual freight added to point of delivery; 0.26 and including 0.60 carbon, $1 advance; 0.61 to 1.00 carbon, $2 advance. Billets smaller than 4 x 4 in., $2 advance; sheet and tin bars, $2 advance. Bessemer and open-hearth rods are held at $25 to $25.50.

Ferro-Manganese.—There is little demand, and domestic ferro continues to be held at $41 per ton in carload lots delivered at buyer's mill at any point east of the Mississippi.

Spelter.—The market continues firm, and prime western grades are held at 5.10c, Pittsburg, in carload lots.

Muck Bar.—There is little demand for muck iron which is held nominally at $24, Pittsburg.

Skelp.—The skelp market is somewhat firmer, due to the recent buying. Steel skelp, grooved and sheared is held at 1.25c to 1.30c, while iron grooved is held at 1.40c and sheared at 1.45c to 1.50c.

Rails and Track Material.—During the month of September the rail mills received orders for 93,000 tons from railroads in this country. A meeting of the pool is scheduled for next month, when prices for 1905 will be fixed. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 16 to 40 pounds, $20 to $21. Spikes, 1.55c to 1.60c.

Plates.—The Riter-Conley Mfg. Co. has received an order for a gas tank to be erected at Milwaukee which will require 3,500 tons of plates and other material. When completed it will be the largest tank in the world. The order for plates to be used in the construction of the new freighters to be built by the United States Steel Corporation has not yet been placed, although it is certain that when placed the Carnegie Steel Co. will receive it. There is a better demand for plates from tank and boiler manufacturers, but the total is still below normal. We quote as follows: Tank plate, ¼ in. thick, 6¼ to 24 in., inclusive, 1.30c f. o. b. mill, Pittsburg; over 24 in. up to 100 in., 1.40c. Extras are as follows per pound: Flange and boiler steel, 10c; marine, A. B. M. A., and ordinary fire box, 20c; still bottom, 30c; locomotive fire box, 50c; plates over 100 in. up to 110 in. in width, not less than 5c per 100 lb. extra; plates 110 in. to 115 in. wide, not less than 10c extra; 115 to 120 in., 15c extra; plates 120 in. to 125 in. wide, not less than 25c extra; plates 125 in. to 130 in., not less than 50c extra; plates 130 in. wide, not less than $1 extra; plates 3-16 in. thick, $2 extra; gauges 7 and 8, $3 extra; No. 9, $5 extra. Five cents extra for less than carloads. Terms net cash in 30 days, and for all points of delivery in the United States except the Pacific Coast.

Structural Material.—The order for 4,000 tons of structural steel for the new Wabash freight station has been practically placed, the name of the successful bidder being temporarily withheld. James Stewart & Co., of this city, have secured the contract for the erection of a 20-story building for the Commercial Cable Co., in New York. The building is to be erected on steel caissons extending into the ground 75 ft. to rock. A second contract secured by this concern is for the erection of a 12-story building for the Bank of Commerce at Norfolk, Va. A third contract is for a 3-story building for the National Exchange Bank, of Baltimore. All these buildings are of steel construction and 5,000 tons of material will be required. We quote as follows: Beams and channels, up to 15 in., 1.40c; over 15 in., 1.50c; angles, 3 x 2 up to 6 x 6, 1.40c; zees, 1.40c; tees, 1.45c; angles, from 3 to 16 in., 1.40c; universal and sheared plates, 6¼ to 24 in inclusive, 1.30c; over 24 in., 1.40c base.

Bars.—Local mills continue to receive specifications to fill up depleted stocks and the outlook is exceedingly bright. The agricultural implement manufacturers are of course taking the biggest portion of the tonnage, although vehicle manufacturers are buying more heavily than for some time. We make the following quotations: Bar iron, 1.25c to 1.30c, Pittsburg; hoops, 1.55c, and bands 1.35c, both taking bar extras. Bessemer and open-hearth steel

bars, 1.30c; plow and cultivator beams, 1.30c, net; channels, angles, zees and tees, under 3 in., 1.40c; the following differentials are maintained on steel: Less than 2,000 lbs of a size and not less than 1,000 lbs., 10 cents advance; less than 1,000 lbs. of a size, 30 cents advance.

Pipes and Tubes.—There is no improvement in merchant pipe and the time has passed for the appearance of a heavy fall demand. Discounts to consumers, carload lots, f. o. b. Pittsburg, plus freight to destination according to Tube Rate book, are as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch	71	55	69	53
⅜ and ½ inch	75	63	73	61
¾ to 6 inches	79	69	77½	67½
7 to 12 inches	74	59	72½	57
Extra Strong Plain Ends.				
⅛ to ⅜ inch	64	52	62	50
½ to 4 inches	71	59	69	57
4½ to 8 inches	67	55	65	53
Double extra strong plain ends, ½ to 8 inches	60	49	58	47

MERCHANT BOILER TUBES, LESS CARLOADS, 22 FEET AND UNDER.

	Steel.	Iron.
1 to 1½ inch	48	43
1¾ to 2¼ inches	60	43
2½ inches	62	48
2¾ to 5 inches	68	55
6 to 13 inches	60	43

Sheets.—The demand for sheets has improved materially and the market is more firmly established on a basis of 2.10c for 28 gauge. We make the following quotations on black sheets: No. 8, 1.60c; No. 9, 1.65c; Nos. 12 to 14, 1.70c; Nos. 15-17, 1.75c to 1.80c; Nos. 18-21, 1.85c to 1.90c; Nos. 22-24, 1.95c; Nos. 25-26, 2c; No. 27, 2.05c; No. 28, 2.10c to 2.15c; No. 29, 2.35c to 2.40c; No. 30, 2.50c to 2.55c. Galvanized: Nos. 12-17, 2.20c to 2.25c; Nos. 18.21, 2.35c to 2.40c; Nos. 22-24, 2.50c to 2.55c; Nos. 25-26, 2.65c to 2.70c; No. 7, 2.90c; No. 28, 3.10c; No. 29, 3.45c to 3.50c; No. 30, 3.85c to 3.90c.

Wire and Wire Nails.—While demand continues good it is not as heavy as early in September. While the fall demand has been good the indications are that the aggregate tonnage will be below the purchases of September and October last year. Locally prices are being firmly maintained. We make the following quotations: Wire nails, jobbers' carload lots, $1.60; retailers' carloads, $1.65, and less than carloads, $1.75; painted barb wire, $1.75 to jobbers in carloads; retailers' carloads, $1.80, and less than carloads, $1.90, with 30 cents for galvanizing. Annealed smooth fence wire is held at $1.45, with the usual differentials to retailers for carloads and less than carloads. Quotations are all f. o. b. Pittsburg, 60 days, with 2 percent discount for cash in ten days. Iron and steel cut nails are held at $1.65 to $1.70.

Merchant Steel.—A better demand for merchant material is reported, although the demand for shafting is not nearly great enough to keep all the mills on at more than half their capacitv. We make the following quotations: Toe calk, 1.90c; carriage spring steel, 1.75c; tire steel, 1.50c to 1.55c; plow steel, 6 in. and under, 1.35c for Bessemer and open-hearth; plow slabs, ¼ in. and heavier, 1.60c. Drawn and cold rolled shafting is held at 52 percent off in carload lots and 47 off in less than carload lots.

Old Material.—The accumulations of scrap in the yards of the leading railroads and dealers are exceedingly heavy and no improvement in prices can be expected until a portion of this material is worked off. The Pennsylvania railroad alone has about 60,000 tons of material and all of the roads in the Pennsylvania system easily are carrying 100,000 tons. On the other hand, the steel mills are not buying heavily and the foundries have not figured in the market for many months. We make the following quotations, gross tons: Heavy melting stock, $11.50 to $12.50; low phosphorus, $14.50 to $15; re-rolling rails, $12 to $12.50; sheet scrap, $10 to $10.50; No. 1 cast, $10 to $11; No. 1 wrought, $11.50 to $12, and cast iron borings $6.75 to $7.

Coke.—The Lackawanna Steel Co. this week purchased furnace coke to cover its requirements until the end of the year amounting to 900 tons daily and this may be increased later to 1,600 tons. In addition 1,000 tons of coal daily will be purchased to supply the producers. A large amount of the independent coke supply has been cleaned up by this purchase and the market is a trifle firmer. For delivery after the first of the year producers will not contract below $1.50 for furnace, although $1.40 can be done for delivery to the end of the year. Demand for foundry coke is improving and prevailing prices range from $1.75 to $1.85. The H. C. Frick Coke Co. is buying a large amount of coke from outside producers and it is probable that a large stock of coke will be accumulated at one of its nearby plants to guard against strikes and other contingencies. During the week ending Saturday, Oct. 1, the production of the upper region amounted to 219,263 tons, while the output of the lower region was 61,178 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, Oct. 11.

Not for a year past, have the general conditions in the iron and steel trade been so encouraging as at the present time. Optimism is the keynote of the local market, and the indications point to an active fall and winter trade. The consensus of opinion here is that the enlarged activity will continue uninterruptedly throughout the balance of the year. The strongest indication of this fact is in the activity of lake shipbuilders and railroads. In the past month, the former have received orders for 13 new vessels, and it is understood additions to the ore fleet of the United States Steel Corporation are under consideration. Contracts placed and pending for new rolling stock, according to local authority, aggregate more than 12,000 cars, which it is estimated will require upwards of 100,000 tons of iron and steel in various shapes. In other departments of consumption, notably the implement trade, demand for iron and steel is heavy, all consumers sending in large specifications.

Pig iron has gathered strength from week to week, and in the past few days Southern grades have been put on the basis of $10 Birmingham for No. 2 foundry. Nearly all the Southern furnaces have sold their capacity for this year or are out of the market, and most of them are declining to quote for deliveries in 1905. Northern iron has also improved with the stiffening of Southern grades; and while no announcement of any advance has been made, it is doubtful if a local furnace would sell much iron at $13.50 Chicago for No. 2 foundry. There is a better demand for all classes of finished material, and an absence of price cutting. Axle billets have been conspicuous in the buying of the week, the orders ranging from lots of 3,000 tons down. New business in standard rails amounted to 5,000 tons, while the transactions in steel bars included one lot of 8,000 tons. Plates and structural shapes, while showing some improvement over the tonnage of the week preceding, are only moderately active. Light rails are stronger both as to prices and demand. Sheets are selling freely on the basis of 2.26½c Chicago for No. 28 gauge, though the galvanized product is not so active. New business and specifications for iron bars and merchant steel are encouraging, and bars are firm at 1.35c to 1.40c Chicago. Scrap is quiet, though dealers are having little difficulty in maintaining their prices. Wire products and tubular goods are in good condition, the business of the week under review comparing favorably with the tonnage of the same period of a year ago.

Pig Iron.—Without any formal announcement, practically every furnace in the South has advanced its prices during the past week 50 cents a ton, and No. 2 foundry is now quoted at $10 Birmingham or $12.65 Chicago. There is strength in the situation, warranting the belief that producers in this instance will be able to maintain the new basis for the balance of the year, notwithstanding the unsuccessful attempts in this direction in the past nine months. Certainly, it is true that not since the flush times of a year and a half ago have the conditions been so favorable to an advance as they are today, and neither have producers had the situation so well in hand since the days of the Southern Furnace Association. All the large interests have either withdrawn from the market or have sold their output for the balance of the year, and posi-

tively decline to quote on deliveries for 1905. The bulk of the iron that has been sold to date has been on the basis of $9.25 and $9.50 Birmingham, one interest selling upwards of 15,000 tons at these prices, and another 18,000 tons, just prior to the advance to the $10 basis. Both these companies are now out of the market for the balance of the year. The inquiry in the past week, however, has been largely for next year's delivery, many melters signifying a willingness to contract for wants in the new year if furnaces would only permit them. Northern irons are without material change in price, although considerably stronger as a result of the improvement in Southern grades. Local No. 2 can be bought at $13.50 Chicago, if the order is of a desirable nature, although some makers are quoting $13.75 as their minimum. Lake Superior charcoal has advanced to $15.25 Chicago, and Ohio strong softeners are also higher than a week ago. The demand for silicon irons is very active and prices show an inclination to move upward. We have revised our quotations as follows:

Lake Superior Charcoal	$ 15 25
Northern Coke Foundry No. 1	14 00 to 14 25
Northern Coke Foundry No. 2	13 50 to 13 75
Northern Coke Foundry No. 3	13 00 to 13 25
Northern Scotch Foundry	15 00 to 15 50
Ohio Strong Softeners No. 1	14 80 to 15 30
Ohio Strong Softeners No. 2	14 30 to 14 80
Southern Coke Foundry No. 1	14 15
Southern Coke Foundry No. 2	13 65
Southern Coke Foundry No. 3	13-15
Southern Coke Foundry No. 4	12 90
Southern No. 1 Soft	14 15
Southern No. 2 Soft	13 65
Southern Gray Forge	12 90
Southern Mottled	12 65
Southern Silveries (4% to 6% Silicon)	14 85 to 15 85
Jackson Co. Silveries (8% to 10% Silicon)	17 80 to 18 30
Alabama and Georgia Car Wheel	18 85 to 19 35
Malleable Bessemer	14 00
Alabama Basic	13 15 to 13 40

Billets.—Axle billets have been in excellent demand in the past week, all producers reporting a marked improvement in their sales. One lot of 3,000 tons was taken by a large Western interest from a local consumer, the price not being made public, though it is believed a concession was made. We quote association prices, Chicago delivery, on Bessemer and open-hearth billets, 4 x 4 and larger, up to .25 carbon, $22.50; up to and including .60 carbon, $1 extra. Billets 3⅞ inches and smaller, and sheet and tin bars $24.50. Wire rods, $26.50 to $27 Pittsburg.

Bars.—Specifications for both iron and steel bars continue to come forward in excellent volume. Not for months has the business been so heavy as at the present time, and mills are hard pressed to keep up with their deliveries. New business is of fair volume, one large contract taken being for 8,000 tons of steel bars. Iron bars are firm at 1.35c to 1.40c, the latter price being asked on all small orders. Car business shows a steady increase, though it is still susceptible of further improvement. Hard steel angles rolled from old rails are firmer, selling now from 1.30c to 1.35c. The high price asked for old rails is responsible largely for the increased values of this product. Hoops and soft steel angles are in fair demand. We quote mill shipments, Chicago delivery, as follows: Soft steel bars, 1.40c to 1.46½c; soft steel angles, less than 3 x 3, 1.56¼c; hoops, 1.71½c. On lots from store, we quote, iron bars, 1.70c to 1.75c base full extras; steel bars, 1.70c to 1.80c base half extras; hoops, 2c full extras.

Sheets.—Tehre is a steady increase in the demand for sheets, and a marked absence of price cutting. Lighter gauges seem to be the most popular. We quote one pass, cold rolled, blue annealed sheets, carload lots, mill shipments, Chicago delivery, as follows: Nos. 9 and 10, 1.71½c to 1.76½c; Nos. 11 and 12, 1.76½c to 1.81½c; Nos. 13 and 14, 1.81½c to 1.86½c; Nos. 15 and 16, 1.91½c to 1.96½c. On box annealed, one pass, cold rolled: Nos 18 and 20, 2.01½c to 2.06½c; Nos. 22 and 24, 2.06½c to 2.11½c; Nos. 25 and 26, 2.11½c to 2.16½c; No. 27, 2.16½c to 2.21½c; No. 28, 2.26½c to 2.31½c; No. 29, 2.41½c to 2.46½c No. 30, 2.51½c to 2.56½c. We quote lots from jobbers' stocks as follows: No. 10, 1.90c to 2c; No. 12, 1.95c to 2.05c; No. 14, 2c to 2.10c; No. 16, 2.10c to 2.20c; No. 18, 2.20c to 2.30c; No. 20, 2.25c to 2.35c; No. 22, 2.30c to 2.40c; No. 24, 2.35c to 2.45c; No. 26, 2.40c to 2.50c; No. 27, 2.50c to 2.60c; No. 28, 2.60c to 2.70c; No. 29, 2.70c to 2.80c. Galvanized sheets are fair and prices steady. We quote Pittsburg discounts, f. o. b. mill, 80 and 5 to 80 and 10. For shipment from stock, we quote heavy gauges and wide widths, 75 and 5 to 75 and 10 percent; for light gauges, 75, 10 and 7½ percent to 80 percent.

Structural Steel.—For plain material, there is an excellent demand, though the orders are largely for small tonnages. None of the contracts for the buildings reported a week ago has yet been placed, and it is not known definitely when action on them will be taken. With the reservation that structural angles up to 6 x 6 can be bought at about $1 a ton below official prices, we quote carload lots, Chicago delivery: Beams and channels, 3 to 15 in. inclusive, 1.56½c, Chicago; angles, 3 to 6 in., ¼-in. and heavier, 1.56½c; angles, larger than 6 in. on one or both legs, 1.66½c; beams, larger than 15 in., 1.66½; zees, 3-in. and over, 1.56½c; tees, 3-in. and over, 1.61½c, with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. Store prices on structural materials are 1.80c to 1.90c for angles, beams, channels, base sizes, with 1.90c to 2c for 18, 20 and 24-in. beams; tees and zees, 1.85c to 1.95c. These prices are for either random lengths or cut to lengths.

Plates.—There is only a moderate demand in this market for plates, though the week's tonnage is of greater proportions than that for the preceding seven days. Buyers, however, are sounding the market freely, and a greater inprovement is looked for in the near future. We quote association prices, carload lots, Chicago delivery, as follows: Tank steel, ¼-in. and heavier, 24-in. wide and under, rectangular plates only, 1.46½c base; over 24-in. to 100-in. wide, 1.56½c base; flange steel, 1.66½c base; marine steel, 1.76½c base, all full extras. Plates, 3-16-in. thick, $2 extra; gauges 7 and 8, $3 extra; No. 9, $5 extra. Less than carload lots, 5c extra. Prices from store are as follows: Tank steel, ¼-in. and heavier, 1.80c to 1.90c; 3-16, 1.90c to 2c; No. 8, 1.90c to 2c; flange steel, 2.05c to 2.15c.

Rails and Track Supplies.—Demand for heavy rails is not active, due to the general feeling that prices will be reduced at the coming meeting of the rail pool. However, in the past week, orders have been placed by two interurban roads for an aggregate of nearly 5,000 tons for quick delivery, one of 3,000 tons being for the Aurora, DeKalb and Rockford railway. Light rails are very active and prices are stiffening. We quote as follows: Heavy sections 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; light rails, $22 to $24; track supplies, f. o. b. Joliet mill, angle bars, 1.30c; spikes, first quality, 1.60c; track bolts, 3¼ x ¾, with square nuts, 2.20c to 2.30c per 100 lb.; with hexagon nuts, 2.35c to 2.45c.

Merchant Steel.—Some new business has been placed with mills, though the heavy volume of specifications is the brightest feature of the week's trade in this material. Prices are without change, and we quote carload lots, mill shipments, Chicago delivery, as follows: Spring steel, 1.85c; sleigh shoe, flat sizes, 1.51½c; concave and convex, 1.60½c to 1.71½c; cutter shoe, 2.25c; smooth finished machinery steel, 1.71½c; smooth finished tire, 1.66½c; plow steel, 2.20c and upwards, according to quality; toe calk steel, 2.01½c; crucible tool steel 6½c to 8c; special grades of tool steel, 13c and up; cold rolled shafting 52 percent from list in carload lots, and 47 percent discount in less than carload lots.

Merchant Pipe.—A fair demand continues to be felt from all parts of the territory contiguous to this market, jobbers especially laying in large stocks. Prices are without change, and we quote carload lots, mill shipments, random lengths, f. o. b. Chicago as follows:

MERCHANT PIPE.

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛ and ¼ inches	69.35	53.35	67.35	51.35
⅜ and ½ inches	73.35	71.35	71.35	69.35
¾ to 6 inches	77.35	67.35	75.85	65.85
7 to 12 inches	72.35	57.35	70.85	55.85

Boiler Tubes.—Jobbers report an improved demand as well as firmer prices. We quote carload lots, mill shipments, Chicago delivery, which are without change, as follows:

BOILER TUBES.

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1¼ inch	46.35	41.35	52.35
1¼ to 2¼ inch	58.35	41.35	40.35
2½ inch	60.35	46.35	43.35
2¾ inch to 5 inch	66.35	53.35	Up to 4 inches. 50.85
6 to 13 inch	58.35	41.35	

The following are the agreed discounts from store:

	Steel.	Iron.	Seamless Steel.
1 to 1¼ inches, inclusive	42½	37½	40
1¼ to 2¼ inches, inclusive	52½	35	37½
2½ inches, inclusive	55	37½	40
2¾ to 5 inches, inclusive	62½	47½	47½
6 inches and larger	52½	35	..

Cast Iron Pipe.—The week has been marked by no large sales, the aggregate tonnage being made up of routine orders. These are fairly numerous. Prices are strong and without change. We quote, carload lots, Chicago delivery, as follows: 4-inch water pipe, $25.50; 6-in. to 12-in., $24.50; larger sizes, $24; gas pipe, $1 a ton higher.

Wire Products.—No cessation is to be noted in the active demand for wire products. Jobbers' sales continue heavy, and owing to the delay in shipments they have some difficulty in replenishing their stocks as quickly as could be desired. Prices are without change, and we quote carload lots to jobbers, mill shipments, Chicago delivery, as follows: Wire nails, 1.75c; painted barb wire, 1.90c; galvanized barb wire, 2.20c; smooth annealed wire, 1.60c; smooth galvanized wire, 1.90c; polished staples, 1.85c; galvanized staples, 2.15c. Less than carload lots to jobbers are 5 cents higher than above pric s. The retail trade is quoted 5 cents extra over the foregoing on carload lots, and 10c extra on less than carload lots. Bale ties are unchanged at 82½c and 5 percent discount f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 ans 5 percent discount from list f. o. b. Joliet and DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Foundry Coke.—There is fair demand from the West and prices are holding up well. More contracting for future wants is being done at the present time than at any other period this year. Prices are without material change, and we quote from Wise county, Va., $1.75 to $2 at the ovens, or $4 to $4.25 Chicago. Coke from the Pocahontas and New River districts, the freight rate of which to Chicago is $2.65, is selling on the basis of $1.65 to $1.75 at the ovens. Connellsville standard 72-hour grades, $1.90 to $2 at the ovens, or $4.55 to $4.65 Chicago. Milwaukee Solvay coke, $4.65 to $4.75 Chicago.

Old Material.—The local market has little life to it, the demand from consumers of scrap being of small proportions. Dealers, however, are still maintaining their prices, and there is no change to note from those of a week ago. We quote dealers selling prices, gross tons, as follows:

Old steel rails (4 feet and over)	11 50 to 12 00
Old steel rails (less than 4 feet)	10 50 to 11 00
Relaying rails, subject to inspection	21 50 to 22 50
Relaying rails for sidetracks	18 00 to 20 00
Old wheels	11 00 to 11 50
Heavy melting steel	10 00 to 11 00
Mixed country steel	7 00 to 7 50
Low phosphorus scrap (.04 and under)	11 00 to 12 00

The following quotations are for net tons:

No. 1 R. R. wrought	12 00 to 12 50
No. 2 R. R. wrought	11 00 to 11 50
Shafting	12 50 to 13 00
Dealers' Forge, No. 1	9 00 to 10 00
Wrought pipe and flues	8 50 to 9 00
No. 1 cast, 150 lb. and less	10 00 to 10 50
No. 1 mill	6 00 to 6 50
Country sheet	5 00 to 5 50
No. 1 boilers, cut	8 50 to 9 00
Boiler punchings	9 50 to 10 00
Iron car axles	16 50 to 17 00
Steel car axles	13 50 to 14 00
Iron axle turnings	7 50 to 8 00
Steel axle turnings	7 50 to 8 00
Cast borings	4 50 to 5 00
Mixed borings, etc.	4 25 to 4 50
Wrought turnings	6 75 to 7 25
Machine shop turnings	6 75 to 7 25
Railroad malleable	9 00 to 9 50
Agricultural malleable	9 00 to 9 50
Stove plate and light cast scrap	9 00 to 9 50
Old iron splice bars	13 00 to 13 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Oct. 12.

Reports are more favorable this week than for many months. The feeling that conditions have decidedly improved is shared by all connected with the trade from ore sellers to scrap dealers. While no boom is talked of, it is generally believed that the present improvement will not be short lived.

Iron Ore.—Shipments up to date this month indicate that October will make as good a showing as September, surpassing that of October, 1903. Railroads are now having some difficulty in furnishing cars and dispatch is not as prompt as it has been. A rather disappointing feature is the fact that shipments to some furnaces connected with steel plants are to be reduced considerably below the tonnages provided in the season's program, which was outlined in the spring, when prospects were far from bright. The change of policy seems to presage periods of inactivity for some stacks which it has been anticipated would operate continuously throughout the winter. Ore prices are about as follows: Old range non-Bessemer, $2.65 to $2.75; Mesabi non-Bessemer, $2.50; old range Bessemer, $3.25 to $3.35; Mesabi Bessemer, $2.75 to $3. Freight rates are firm at 70 cents from head of the lakes; 60 cents from Marquette and 55 from Escanaba. On some ores sellers are asking the slight advance represented in higher lake freights.

Pig Iron.—Inquiries and sales are more numerous and buyers are urging prompt shipments on contracts. The market is firmer and sellers are declining to quote less than $12.25 for No. 2 foundry for delivery after Jan. 1. A few sales for delivery during the first quarter of 1905 have been made at $12.25. It is now very difficult, if not impossible, to buy iron in the Valley at less than $12 for the remainder of this year. Basic and Bessemer are sold at $12 to $12.10 Valley, and the demand has improved very much. One furnace, now out of blast, has disposed of 10,000 tons of basic and malleable within a week and it has been decided to go in blast at once. Southern iron is now quoted at $10 Birmingham, for No. 2, but the leading producers are not pressing sales, as they have sold up pretty well for the remainder of the year and output is still somewhat uncertain on account of the miners' strike. We quote as follows for Cleveland delivery:

Bessemer	$12 85 to 12 95
No. 1 Strong Foundry	12 85 to 13 00
No. 2 Foundry	12 25 to 12 50
No. 2 Southern	13 75 to 13 85
Gray Forge	12 00 to 12 10
Gray Forge, Southern	12 00 to 12 15
Lake Superior charcoal	14 75 to 15 00

Finished Material.—There is improvement all along the line, even in standard sections of rails, on which inquiries have been received from traction companies of apparently good financial standing. The orders placed and in prospect for new vessels will call for about 50,000 tons of material and keep the shipyards busy during the winter. On steel bars at 1.39½c Cleveland for Bessemer and 1.44½c for open-hearth specifications are coming in most satisfactorily. Bar iron has been advanced to 1.35c at the mill and is in fair demand. The advance was necessitated by the high price of scrap. Sheet mills are receiving orders nearly up to their capacity and little is heard of cutting in prices. The prices of the principal producers through jobbers are as follows, Cleveland delivery, the freight from Pittsburg being 9½ cents: Mill sales of black sheets in carload lots, No. 10, 1.64½c; No. 11-12, 1.69½c; No. 14, 1.79½c; No. 16, 1.89½c; No. 27, 2.14½c; No. 28, 2.24½c. Galvanized, mill sales, No. 14, 2.24½c; No. 16, 2.34½c; No. 18-20, 2.49½c; No. 22-24, 2.64½c; No. 25-26, 2.84½c; No. 27, 3.04½c; No. 28, 3.24½c. Out of stock, black sheets: ¼-in. 1.90c; 3-16-in., 2c. Blue annealed: No. 10, 2.05c; No. 12, 2.10c; No. 14, 2.15c; No. 16, 2.25c. One pass cold rolled: No. 18-20, 2.35c; No. 22-24, 2.40c; No. 26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 30, 3c. Galvanized out of stock: No. 16, 2.60c; No. 18-20, 2.70c; No. 22-24, 2.85c; No. 26, 3.05c; No. 27, 3.25c; No. 28, 3.45c; No. 30, 4.25c.

Old Material.—Demand has increased and prices are tending upward, especially in old iron rails, malleable iron, railroad wrought and steel axles. Stove plate is dull. We quote as follows, gross tons, Cleveland delivery:

Old iron rails	$17 00 to 18 00
Old steel rails (over 6 feet)	12 50 to 13 50
Old steel rails (under 6 feet)	12 00 to 12 50
Old car wheels	10 00 to 11 00
Steel boiler plate	9 00 to 10 00
Malleable iron (railroad)	11 00 to 12 00
Malleable iron (agricultural)	8 50 to 9 50
Heavy steel	12 00 to 13 00

We quote as follows, net tons:

No. 1 R. R. wrought	$12 00 to 12 50
No. 1 busheling	10 50 to 11 00
No. 1 machine cast	9 50 to 10 50
Iron axles	16 00 to 16 50
Axle turnings	9 00 to 10 00
Wrought turnings (free from cast)	7 50 to 8 00
Grate bars	7 00 to 8 00
Pipes and flues	8 50 to 9 00
Tank iron	8 00 to 8 50
Hoop and band iron	5 00 to 5 50
Sheet iron	4 00 to 5 00
Wrought drillings	6 50 to 7 00
Stove plate	8 00 to 9 00
Steel axles	14 00 to 15 00
Cast borings	5 00 to 5 50

CINCINNATI.

Oct. 11.

The coke market is somewhat more active and asking prices are in some instances slightly higher. Connellsville foundry coke is quoted mainly at $2 to $2.10 f. o. b. Connellsville. Sales fair.

Pig Iron.—The market has taken on quite a firm tone so far as the Southern product is concerned. The current asking price for foundry iron is now $10 Birmingham, basis for No. 2. There is a large inquiry, in which the cast iron pipe makers are the most conspicuous. It is said in the trade that this interest alone is ready to take 25,000 tons or more and will probably need that much to keep going the balance of the year. A local electric manufacturing concern is asking for prices on 1,200 tons for next year's delivery. Three Indiana consumers are in the market for this year's delivery, one for 2,000 tons, another for 2,500 tons and a third for 1,000 tons. Several sales have been made of round lots of from 500 to 1,000 tons on the $10 basis. A heavy inquiry for basic iron is reported. There is quite an amount of inquiry for prices for delivery early in next year, but some furnaces are not inclined to quote on this business. There is some Southern iron to be had at $10 Birmingham for next year, but in other cases asking prices are $10.50 Birmingham. While $10 has been obtained for No. 2 and is the ruling price, today, some sales last week were close to $9.75 basis. The advance in Southern irons has had the effect of causing some buyers to hold off. This class argue that it will pay to take chances on the market under the belief that prices will not be any higher after the first of the year than they are now, and they may be lower. There s ems to be a decidedly strong feeling among the Southern furnacemen, and there is considerable talk repeated here to the effect that higher prices are expected to prevail, and there is a reluctance to sell which reinforces these statements. In Northern irons there is not so much strength shown and it is said that an Ohio furnace this week has taken on business at $11.50 for No. 2. Some of the Northern furnaces, however, are marking up prices and holding firm. In most cases $12 Ohio furnace is quoted and some business has been done above this figure, where there was limited competition. Current quotations for carload lots f. o. b. Cincinnati are as follows:

Southern Foundry No. 1	$ 13 25
Southern Foundry No. 2	12 75
Southern Foundry No. 3	12 25
Southern Foundry No. 4	11 75 to 12 00
Southern Foundry No. 1 soft	13 25
Southern Foundry No. 2 soft	12 75
Gray Forge	11 75 to 12 00
Northern Foundry No. 1	13 65
Northern Foundry No. 2	13 15
Southern car wheel iron	16 25 to 16 50

Finished Material.—There is a stronger tone to the market and an encouraged feeling that the future has better things in store for the trade. No price changes have occurred and the demand has been only fair. Orders for structural shapes from the structural yards have been of larger size. The demand for bars is fair. Sheets and plates are dull. Bar iron is quoted at 1.35c; steel bars at 1.43c, half extras, with dealers quoting 1.60c to 1.75c for iron and steel out of store. Galvanized sheets are at 80 and 10 percent off. We quote black sheets, No. 27, at 2.25c in carlots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.60c; No. 27, 2.50c; No. 16, 2.10c; No. 14, 2c; No. 12, 1.95c; No. 10, 1.90c. Tank plates are dull and sell out of store at 1.85c for ¼-in. and 1.95c for 3-16-in., No. 8 and No. 10. Beams and channels are quoted at 1.85c from stock and angles at 1.85c to 1.90c for base sizes.

In merchant pipe there is no change in prices and trade is rather quiet. Independent mills are still shading the schedule. Carload lots are quoted as follows f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼ inch	69.7	53.7	67.7	51.7
⅜, ½ inch	73.7	61.7	71.7	59.7
¼ to 6 inch, inclusive	77.7	67.7	76.2	66.2
7 to 12 inch, inclusive	72.7	57.7	71.2	55.7

BOILER TUBES.

	Steel. Percent.	Iron. Percent.
to 1½ inch	41.2	37.7
1¾ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
6 to 13 inch	54.2	36.7

Old Material.—The strength in the pig iron market has not as yet had any influence on the scrap iron market and demand is quiet. Stove plate is quoted a shade higher, otherwise prices are unchanged. We quote:

Old No. 1 railroad wrought, net tons	$11 00 to 11 50
Cast machine and foundry, net tons	9 50 to 10 00
Old iron rails, gross tons	14 00 to 14 50
Old steel rails, gross tons	10 00 to 11 00
Old short lengths, gross tons	11 00 to 11 50
Old iron axles, net tons	14 00 to 15 00
Stove plate, net tons	7 00 to 7 50
Wrought turnings, net tons	6 00 to 6 50
Cast borings, net tons	3 50 to 4 00

After an idleness of nearly one year the Watts furnace at Middlesborough, Ky., will be put in blast by Nov. 15, and is now prepared to book business. About 800 tons of this iron has been sold this week. A regular price basis has not yet been established. The Domhoff & Joyce Co., Cincinnati, is sales agent.

NEW YORK.

NEW YORK OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., Oct. 11.

Pig Iron.—The past week has been chiefly interesting for the important developments in the Southern pig iron market. Two of the largest Southern makers have been out of the market for all the week, one because of stock-taking and the other because of labor troubles. The former will not book any orders for about two weeks, while the other cannot say now when it will begin to do so. Coincident with the withdrawals of these companies, all Southern brands have advanced 50 cents per ton over last week's prices, so far as delivery for this year is concerned. Southern No. 2 foundry, which could be purchased in round lots at $9.50, Birmingham, a week ago, sold at $10 during the week, several thousand tons having been disposed of at this figure. It is too early yet to say whether this price is firmly adhered to, but one company is reported to have refused business at $10. Another producer has turned down orders for several thousand tons at $9.75, this year's delivery. Northern irons have been quite active during the week, with prices practically unchanged, although a Western New York furnace is said to be taking orders in New England at about 50 cents a ton less than is quoted by its Northern competitors. There are some very good inquiries for foundry grades in the market. The New York Air Brake Co. wants 6,000 tons, delivery beginning Dec. 1 and extending into the first quarter of the new year. Richardson & Boynton, of Dover, N. J., will buy 3,000 tons, made up of 1,000-ton lots of Alabama, Virginia and Northern brands, delivery running well into next year. From New England there have come inquiries for several round lots also. As far as general market indications go, furnaces seem at the moment to have the best of it. New York quotations at tidewater follow: Northern No. 1 X, $14.50 to $15; No. 2 X, $14 to $14.50; No. 2 plain, $13.50 to $14; Southern No. 1 foundry, $14 to $14.25; No. 2 foundry, $13.50 to $13.75; No. 3 foundry, $13 to $13.25; No. 4 foundry, $12.50 to $12.75.

Finished Iron and Steel.—The structural material situation during the past week was quiet. Current orders do not make up much of a tonnage, but the business outlook for the near future is a little brighter than it was a week ago. Railroads are still dilatory about going ahead with plans projected some time ago. In plates only a fair business is re-

ported. Sheets continue to be in a little better demand. New York prices at tidewater follow. Angles, 3 to 6 in. x ¼ in. and heavier, 1.54½c; beams, 3 to 15 in., 1.54½c; channels, 3 to 15 in., 1.54½c; beams, 18, 20 and 24 in., 1.64½c; tees, 3 x ¼ in. and heavier, 1.59¼c; plates, carloads, tank, 1.54½c; flange, 1.64½c; marine and ordinary fire box, 1.74½c; refined iron and soft steel bars, 1.44½c; sheets, in carload lots, New York, No. 28, black, 2.30c to 2.35c; galvanized, 3.30c to 3.35c.

Old Material.—The general run of reports is to the effect that prices have been firmer, and transactions more numerous, than for the week preceding our last report. Offerings of rails have been very heavy, with buyers cautious. Heavy steel scrap, cast iron wheels and iron track scrap have been active at firm prices. We quote f. o. b. cars:

Old iron rails	$14 00 to 14 50
Old steel rails, long lengths	11 50 to 12 00
Old steel rails, short pieces	11 00 to 11 50
Relaying rails	19 00 to 20 00
Old car wheels	11 50 to 12 50
Old iron car axles	17 00 to 18 00
Old steel car axles	14 00 to 14 50
Heavy melting steel scrap	11 50 to 12 00
No. 1 railroad wrought scrap	11 50 to 12 00
Iron track scrap	10 75 to 11 25
Wrought pipe	8 50 to 8 75
Ordinary light iron	6 00 to 6 25
Cast borings	5 00 to 5 25
Wrought turnings	6 75 to 7 25
No. 1 machinery cast	10 50 to 10 75
Stove plate	8 25 to 9 75

PHILADELPHIA.

Oct. 11.

The improvement of last week has been maintained, but it is manifested more in sentiment than in sales. Reports from other districts are so optimistic that they have improved the feeling in this city and vicinity.

Pig Iron.—Prices are unchanged, but the market is firmer and there has been good buying. Another week of such business will doubtless result in higher quotations. Furnaces will not sell for the first quarter of next year except at an advance of at least 25 cents. We quote as follows: No. 1 X foundry, $15 to $15.25; No. 2 X foundry, $14.25 to $14.50; No. 2 plain, $13.50 to $13.75; standard gray forge, $12.75 to $13; ordinary gray forge, $12.25 to $12.50; Southern No. 2 X forge, rail, $13.75 to $14.

Steel.—There is more demand, and $22 is the best that can be done in ordinary open-hearth.

Finished Material.—Ship and car building concerns have created a stronger demand for materials which they use. Shapes are more in demand, but bars are dull. On the whole, conditions are considerably improved. Price unchanged, as follows: Plates, 1.43½c to 1.47½c; beams, channels and angles, 1.53½c to 1.65c, according to specifications, and small angles, 1.50c to 1.55c; bars, 1.43½c for carload lots for either iron or steel and the usual advance on part carloads.

Old Material.—There is some improvement in demand, but prices do not change. We quote: No. 1 steel scrap, $12 to $12.50; low phosphorus scrap, $16.50 to $16.75; old steel axles, $15.50 to $16; old iron axles, $18.50 to $19; old iron rails, $15.50 to $16; old car wheels, $12 to $12.50; choice railroad No. 1 wrought, $15 to $15.50; machinery cast, $11.50 to $12; No. 2 light scrap (forge), $10 to $10.50; light scrap (ordinary), $8 to $8.50; wrought turnings, $8.50 to $9; cast borings, $6.50 to $7; stove plate, $9 to $10; wrought iron pipe, $11.25 to $11.75.

BIRMINGHAM.

The Alabama pig iron market is in a very strong position. No. 2 foundry iron is being held firmly at $10 per ton and some of the larger manufacturers are out of the market entirely except to regular customers and then sales are being made only for delivery to the first of the coming year. President Mabon, of the Sloss-Sheffield Steel & Iron Co. is authority for the statement that some of the smaller companies are out of iron almost entirely, while the larger companies which have iron in the yards are not anxious to sell, anticipating that prices will go up.

The United States Cast Iron Pipe Co. has been in the market for a large quantity of iron during the past week, one of its inquiries being for 10,000 tons. It is said considerably more is wanted.

The strike of the union coal miners continues but the operators say that they have the fight won. Their coal production without doubt is on the increase. Deputy sheriffs employed at the mining camps of the Tennessee Coal, Iron & Railroad Co. have been withdrawn, there being confidence that no disorder is to occur.

The Birmingham rolling mills of the Republic Iron & Steel Co. resumed operations today after an idleness of eleven months. Work started in the old puddling mills, the 16-in., 12-in. and 8-in. bar mills, all going on double turn. There is a good demand for finished iron and steel. The Birmingham mills recognize the Amalgamated Association by signing the scale. The Bessemer rolling mills of the Tennessee Coal, Iron & Railroad Co. are in operation as an "open shop." The Gate City mills of the Republic company may start up again in the near future.

The following quotations are given for pig iron: No. 1 foundry, $10.50; No. 2 foundry, $10; No. 3 foundry, $9.50; No. 4 foundry, $9; gray forge, $8.75; No. 1 soft, $10.50; No. 2 soft, $10. Pig iron shipments from the Birmingham district are equal to the production.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., Oct. 11.

Pig Tin.—The market during the week maintained the strength noted in our last report, but the undertone is not as firm. Speculative interests are in control, and prices in the near future will largely depend on their operations. Business conditions are unchanged. The London market for the week was active, with spot strong, and futures slightly weaker. Today's closings follow: Spot, 28.15c to 28.35c; Oct., 28.12½c to 28.25c; Nov., 28.00c to 28.25c. London's closings today follow: Spot, £128 17s 6d; futures, £128 7s 6d. Arrivals for the month aggregate 925 tons, with 1,380 tons afloat.

Copper.—Prices for all grades were advanced ⅛ cent during the week, because of the alleged better outlook for exports and the improvement in domestic conditions, consumers are buying more liberally than they have been for weeks past, especially brass mills. The London market has been active and strong. Closing prices today follow: Lake, 13.00c to 13.12½c; electrolytic, 12.87½c to 13.00c; casting, 12.75c to 12.87½c. London's closings today follow: Spot, £59 13s 9d; futures, £59 16s 3d. Exports for the month to date amount to 6,070 tons.

Lead.—Is quiet and unchanged, spot being 4.20c to 4.30c. St. Louis is firmer at 4.12½c, and London stronger at £12 2s 6d.

Spelter.—Is without interest and firm at 5.15c to 5.20c. St. Louis is stronger at 4.95c to 5.05c. London advanced to £22 15s.

Antimony.—Both Cookson's and Hallett's are 7c asked. Other grades are 6c asked.

Quicksilver.—We quote $40 per flask of 76½ lbs. in lots of 100 flasks. London is £7 15s.

Nickel.—Sales are made at 40c to 47c for large lots down to a ton, and at 50c to 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, Oct. 11.

Consumption of metal seems to be on the increase judged by the activity displayed in the local market. Season contracting is more popular than it has been, the idea prevailing that with the approach of cold weather prices will be apt to advance, as the case in past years. Quotations are firm as follows: Lake copper in carloads, 13⅛c, and for smaller lots, 13⅜c; casting, 12⅞c for carloads, and 13¼c for lesser quantities. Pig tin, 28⅞c to 29¼c, according to quantity. Spelter, 5⅛c to 5⅜c, according to quantity; sheet zinc, 6c for carload lots of 600 lb. casks, and 6.25c to 6.35c for less than carload lots. Pig lead, 4.20c for 50-ton lots; 4.25c for carload lots, and 4.35c for smaller lots.

Old metals are in good demand and prices strong. We

quote copper wire and heavy, 11¼c; copper bottoms, 9¾c; copper clips, 10¾c. Red brass, 9¾c; red brass borings, 7⅞c. Yellow brass, heavy, 7¼c; yellow brass borings, 6¼c. Light brass, 5½c; tea lead, 3¾c; zinc, 3.60c.

Iron and Steel Institute at New York.

Bennett H. Brough, secretary of the Iron and Steel Institute, arrived in New York this week and in the next ten days will co-operate with the American committee in preparing for the New York meeting of the institute and the trip to the iron and steel centers of the United States that will follow it. We have already published the itinerary of the trip and the names of the members of the institute who are coming over. The opening session will be at Sherry's, New York, on Monday evening, Oct. 24, when the president's address and the address of welcome and the response to it will be given. The sessions for papers will be on Wednesday forenoon and afternoon. The following papers are announced:

"Iron and Steel at the St. Louis Exposition," by Prof. H. Bauerman, member of the International Jury.

"A West African Smelting House," by C. V. Bellamy, director of public works, Lagos. An appendix by F. W. Harbord.

"The Influence of Carbon and Phosphorus Upon the Strength of Iron and Steel," by H. H. Campbell, Steelton, Pa.

"The Rateau Low-pressure Turbine at Steelworks and Collieries," by E. Demenge, Paris.

"A Dry Air Blast Apparatus," by James Gayley, New York.

"High Speed Tool-steels," by J. M. Gledhill, Manchester.

"The Determination of Carbon and Phosphorus in Steel," by Baron H. Jüptner von Jonstorff, Vienna; Andrew A. Blair, Philadelphia; Gunnar Dillner, Stockholm, and J. E. Stead, Middlesbrough.

"Acid Open-Hearth Manipulation," by Andrew McWilliam, and W. H. Hatfield, Sheffield.

"A Power Gas Plant for Johannesburg," by P. J. Mormon, London.

The Riter-Conley Mfg. Co., Pittsburg, has been awarded the contract for the erection of a gas tank for the Milwaukee Gas Works, Milwaukee, Wis. It will be the largest in the world, having a capacity of 6,000,000 cu. ft. The tank will be composed of five sections which will be raised as the gas accumulates. The bottom section will be filled with water and will act as a water seal. The diameter of this section will be 226 ft., and each succeeding one will be slightly smaller. Each section will be 34 ft. 9 in. high, making the height of the tank when completely filled about 165 ft. Instead of sinking into the ground as in the case with most of the tanks now used, the entire tank will be above the ground, each section locking into the other as the gas accumulates and lifting each succeeding section. About 3,500 tons of plates and other steel material will be required in its erection. The Riter-Conley Mfg. Co. is now bidding on the erection of a tank to be erected in England which will have a capacity of 20,000,000 cu. ft., but nothing definite as to the time of awarding the contract has yet been learned.

The LaBelle Iron Works, Steubenville, O., will blow in furnace No. 2 on Monday, Oct. 24. It has been under construction for more than a year, and when it is in operation this company will produce all the iron required by its steel plant. The new furnace is 90 x 20 ft. and is equipped with four Massicks & Crooke stoves each 85 x 21. Its annual capacity is estimated at about 150,000 tons. Stack No. 1 of this plant was blown in more than a year ago, and with the two furnaces in operation the annual output will be 300,000 tons.

The Thomas Iron Co., Easton, Pa., publishes a pamphlet of 62 pages, printed on deckledge paper, with dark brown paper cover and embossed title, recounting the celebration of the company's 50th anniversary on June 1, 1904. The addresses and toasts given on that occasion are reprinted, together with newspaper reports and comments. The Thomas Iron Co. recognizes the value not only of making history but of recording it in form for preservation.

LAKE SUPERIOR IRON MINES.

The Jordan mine, a Corrigan-McKinney property at Chisholm, Mesabi range, has ceased shipments for the season, with an output of 185,000 tons.

An order for a new hoisting plant for the Tobin mine at Crystal Falls has been placed by Corrigan, McKinney & Co. At the company's Great Western mine the steam capacity will be increased. It is understood that the mine will soon be unwatered and resume operations.

The Antoine Ore Co., Iron Mountain, Mich., has suspended operations for the season, with an output of 80,000 tons, compared with shipments of 107,000 tons in 1903.

At the Loretto mine, Menominee range, about 70,000 tons of ore are in stock, and it is not probable that more than two cargoes will be forwarded during the remainder of the season. The stock-pile ground has been prepared for a large tonnage and it is not expected that mining will be suspended.

The Penn Iron Mining Co. has suspended shipments from its Norway mine, Norway, Mich. Oglebay, Norton & Co.'s Bristol mine in the Crystal Falls district has also stopped forwarding its product.

The Mineral Mining Co., which is exploring the old Breen mining tract near Waucedah, Menominee range, has one hole down 500 ft. and has removed the diamond drill to a point 300 ft. distant. Shipments of ore from the Ishpeming-Negaunee district of the Marquette range are proceeding rapidly. Considerable ore will be carried over, but none of the properties will be cramped for stocking room.

In the Ironwood district of the Gogebic range the mining outlook is better than at any time since the general curtailment of operations last winter. The Steel Corporation has been shipping steadily for some time and will not have much ore left in stock at the close of navigation.

The central productive portion of the Mesabi formation is as thoroughly explored and its iron ore bodies as accurately mapped as is the surface of a city lot. It is generally agreed that the conditions for finding profitable ore bodies in the eastern Mesabi are unfavorable, and in the western Mesabi the exploration, likewise thorough, is sufficient to vanish any hope of any more big mines being discovered in that section. At President Gayley said at the Institute meeting at Duluth: "A section of the Mesabi district, if one could be made horizontally, would look as though the 17-year locusts had made it a visitation, so numerous are the test holes." There may be other iron districts located in Minnesota, but as for the Mesabi it is no longer an uncertain quantity, and the "trust" controls from 70 to 80 percent of all the ore "in sight" and proven by drill tests, and this condition is not likely to be changed by any subsequent discoveries or developments in the district.—[Mining World.

The American Sheet & Tin Plate Co. announces a wider distribution than has heretofore been made of the "Apollo Best Bloom" weight cards originally brought out by the American Sheet Steel Co. These give the size, gauge, weight per sheet, number of sheets per bundle and square feet of surface in each sized sheet and will be found valuable to every person who estimates upon cornice and other sheet metal work. The company will send one of these cards, which are 19½ x 14 in. in size, printed in two colors upon tough cardboard and ready for hanging, to all metal workers who will send their names to W. C. Cronemeyer, advertising agent, 222 Frick building, Pittsburg.

The Chicago shop of Greenlee Bros. & Co., machinists, 220 West Twelfth street, established for forty years, has been practically abandoned and the business of the concern transfered to a new plant in Rockford. Labor troubles contributed a little to the decision of the owners to move. The company employed 200 skilled men in Chicago of whom 125 were machinists. The machinists have been on strike since early in May.

The Allegheny Steel & Iron Co., Pittsburg, will install an additional sheet mill at its plant, Avenue, Pa., six now being in operation. The Interstate Steel Co., an allied corporation, will also add a sheet mill to the one now in operation.

WOODWORKING MACHINERY EXHIBIT.

The H. B. Smith Machine Co., of Smithville, N. J., has an exhibit in block 4, Machinery Hall, the World's Fair, which comprises some 30 woodworking machines. These are arranged in an area covering 5,000 square feet and a number of the machines are driven by independent electric motors so that they may be shown in motion. The different methods of applying motor drives to woodworking machines have been carefully selected to illustrate the various plans for this purpose and the exhibit is on this account also of very considerable interest to mechanics.

The machines include a double end tenoning machine of modern design and especially adapted for working hard wood and heavy pieces of stock used in the manufacture of furniture and railway cars. The machine has double heads to cut long tenons and is capable of working stock as short as 4⅝-in. and as long as 6½ ft. by 28 in. wide between shoulders, the movable or adjustable end of the machine being accurately set by power. The cope heads are very strongly driven and are mounted on the ways, in this respect being different from the usual design of double end tenoning machines. A smaller machine of the same type and adapted for general purposes is also exhibited. This is of quite similar construction to the large machine, the movable end is, however, adjusted by hand and the cope heads are attached to the cutter head blocks. A single end tenoning machine is shown. This is for working hard wood in door, sash and blind factories. The table of this machine is mounted on roller bearings and moves free and accurately across the ways. A smaller machine of this kind is also on exhibiton.

A large six-roll fast feed flooring machine will plane, and the side heads will work, to 6 in. thicknesses and the one shown will work to a width of 12 in. The under cutter head is placed next to the upper or thicknessing head, works both sides of the board before the side heads and enables the workmen to handle flooring with the face side down. All the adjustments are made from the working side of the machine and the clamps for holding the cutter heads in place are compensating. The machine is fitted with a belt compensating device and the turning of a crank will make all the cutter heads tight as may be required in working very hard wood or taking deep cuts. The same crank will, by a single turn, slacken the belts when working soft wood and making light cuts. There is a triple drum sander shown. This has the sand drums over the work and has an endless feed bed. This feed bed is made of lags faced with rubber to present a slightly yielding surface. This small amount of "give" is said to allow stock of slightly different thickness to come from the machine in properly finished condition. The table lifts and lowers by power and has hand adjustment for fine setting. The sand drums being over the work are found to have a tendency toward raising the dust into a hood overhead and from thence it is drawn by the usual exhaust fans without passing through the working parts of the machine. Two of the drums are oscillated to balance each other and the paper remains automatically taut.

The 10-in. molder is probably the heaviest of its class and weighs over 8,000 lb. The frame is cast solid and the table lowers 12 in. and clamps firmly to the frame in three places. All the outside spindles are of large diameter and the bearings are of the patent clamp type. All four feed rolls are powerfully driven and the adjustments are conveniently made. Other types of molders are on exhibition. There is a 16-in. hand planer or jointer with box frame. This planer has a chute for delivering the shavings to the rear of the machine. Both tables have horizontal and vertical adjustments, the latter being concentric with the cutting circle. The head has four slots and the guide is adjustable for all kinds of work. A reciprocating mortiser and borer is exhibited with compound table and rack and pinion feed. A new quadruple mortising and boring machine will mortise and bore in two ends at the one operation or will bore four holes at a time. A number of sawing machines are on exhibition and there are shapers, surfacers, routers, sanders, etc., forming an extensive and noteworthy collection of recent designs in woodworking machinery.

THE H. B. SMITH MACHINE CO.'S EXHIBIT AT ST. LOUIS.

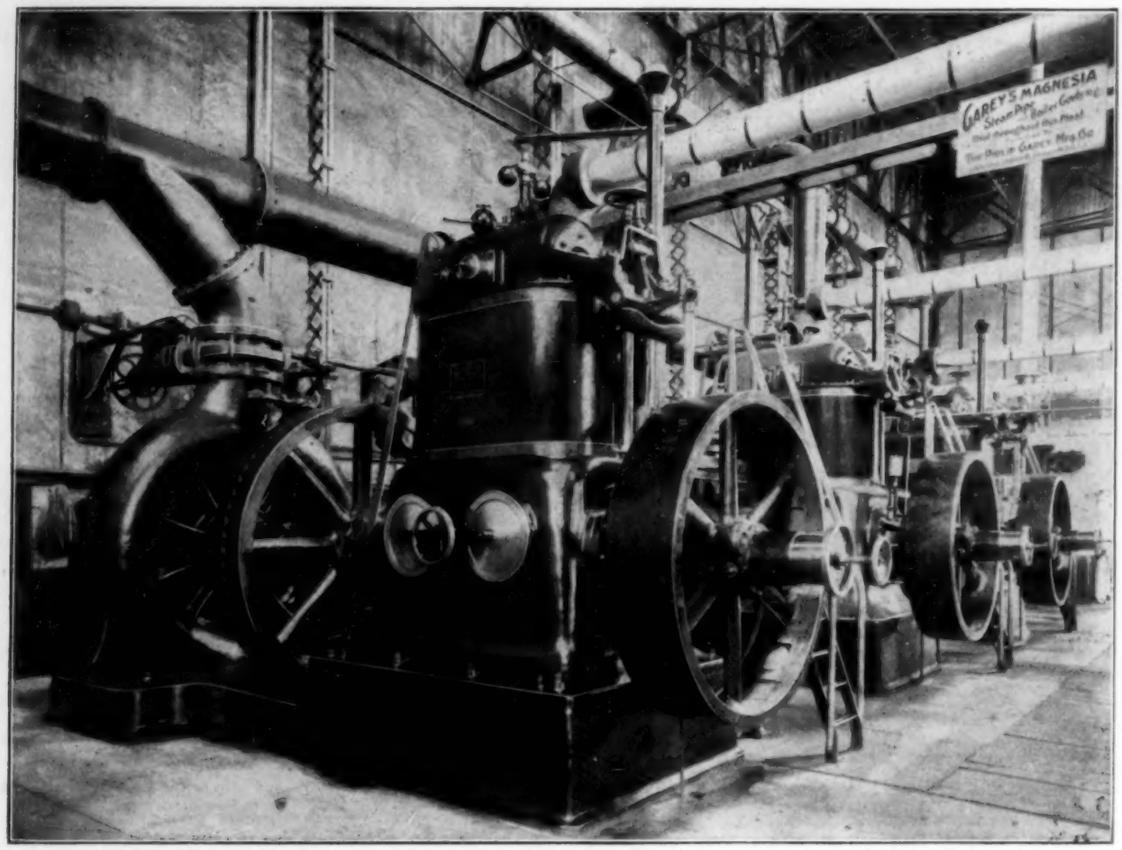
On the application of Robert E. Jennings, receiver for the Carpenter Steel Co., Vice Chancellor Stevens, at Newark, N. J., granted a rule to show cause why an offer of the reorganization committee, headed by J. C. Barron and W. B. Kunhardt, both of New York, for the assets of the corporation should not be accepted. The assets on May 1, 1904, were $573,486 and the liabilities $356,829. The reorganization committee agrees to pay $150,000 cash within 60 days of the acceptance of the offer, to deliver to the creditors of the company who may accept bonds of a new corporation to the full amount of their claims with interest, and to pay the claims of the remainder of the creditors in full within 60 days.

The quarterly meeting of the board of directors of the United States Steel Corporation will be held Oct. 25. At that time the board will act on the dividend for the quarter, will make public the net earnings for the quarter ending Sept. 30, and will announce the unfilled orders on the books. The board will declare the regular dividend of 1¾ percent on preferred stock for the quarter. It is evident that the net earnings will be in excess of $18,000,000 for the three months, which means the continuance of the regular dividend.

The stockholders of the Colorado Fuel & Iron Co., will hold their annual meeting at Denver, Oct. 17. At least 90 percent of the outstanding issue will be voted in favor of the financial rehabilitation plan.

THE EXPOSITION SERVICE POWER PLANT.

The contract for the main service plant for the Louisiana Purchase Exposition was awarded to the Westinghouse Electric & Mfg. Co. shortly after the plans for the exposition had assumed final form. It called for the designing, installation, and equipment of a complete central station to supply electric power for general use throughout the fair—for the night illumination of the 1,240 acres and countless buildings of the Forest City, for pumping the water for lagoons and court basins, cascades and fountains, for operating exhibits and concessions in various parts of the grounds. The entire steam and electric station was designed and installed by Westinghouse, Church, Kerr & Co., and constitutes a model plant of 14,000 h. p. capacity, representative of thoroughly modern practice at minimum cost, such as may be seen in only a few large cities. The four 3,500 h. p. Westinghouse-Corliss vertical cross-compound reciprocating engines within the Westinghouse enclosure at the west end of Machinery Hall, the smaller engines driving exciters in Machinery Hall, the 3,500-h. p. units of the Louisiana Purchase Exposition service plant, although three times as large as the largest at Chicago, are regarded as of only medium size. Indeed, entrance to the service plant is through a full size plaster model of the 35-ft. stationary armature of the 17 7,000-h. p. Westinghouse generators built for the Manhattan elevated and subway roads, New York, and eight 7,000-h. p. Westinghouse turbine units are being installed by the British Westinghouse Co. for the main generating stations of the Underground Electric Railways Co., of London. The Westinghouse Electric & Mfg. Co. now has under construction generators for the Ontario Power Co. of 10,000-k. w., or about 13,500-h. p. capacity, and the Westinghouse Machine Co. is building steam turbines in sizes up to 10,000 h. p. While the steam turbine is the most striking example of the space economy of modern prime movers, occupying less than half the floor space necessary for either vertical or horizontal piston engines of equal capacity, with a similar difference in height, it is interesting to note that the floor space occupied by the Westinghouse-Corliss engines and their direct connected generators in the



WESTINGHOUSE SINGLE ACTING COMPOUND ENGINES FOR THE CIRCULATING PUMPS IN THE EXPOSITION BOILER HOUSE.

engines driving pumps, stokers and cooling tower fans in the service plant section of the Steam, Gas and Fuels building, or boiler house, just west of Machinery Hall, and the Roney mechanical stokers in the latter building were manufactured by the Westinghouse Machine Co. The mechanical draft and cooling tower plants were built from special designs. The plant has been in continuous operation since April 15, maintaining its own load, and, from time to time, carrying extra loads which exhibit plants have been unable to sustain.

The progress achieved in the manufacture of electric generating units of great capacity has been a very important feature of mechanical and electrical engineering since the time of the World's Columbian Exposition. The great central station at Chicago, in 1893, also a Westinghouse installation, was of about the same total capacity as the present plant, but the twelve Westinghouse generators, although then the largest polyphase alternating current machines ever constructed, were each of only 750-k. w., or 1,000-h. p. capacity. The twelve generating units of the Chicago plant constituted then the largest polyphase plant in service—today the four present exposition service plant, 15 x 35 ft. each, is proportionally only about one-ninth of that required at Chicago for six of the twelve 1,000-h. p. Westinghouse generating units there which were belt-driven, each of the latter, with only one-third the capacity of the present units, covering a space 27 x 65 ft.

The Exposition service plant, although it furnishes the main source of power for the world's greatest fair, and carries all of the commercial operating and lighting load on the grounds and Pike, as well as a large part of the decorative night illumination of the main exhibit buildings, is of interest to engineers not so much for its size as for its completeness, and because it resembles in general design such big Westinghouse installations as the 40,000-h. p. station of the Metropolitan street railway system just completed at Kingsbridge, New York, or the 75,000-h. p. station of the New York Edison Co., where eleven Westinghouse-Corliss three-cylinder compound engines, rated at 6,500-h. p. each, the largest engines in service, frequently carry a maximum load of 10,000-h. p. for short periods.

Electric current from the Exposition service plant and from exhibit power plants in Machinery Hall is transmitted over the network of underground cables at a potential of 6,600 volts, transformers being used only at distributing points.

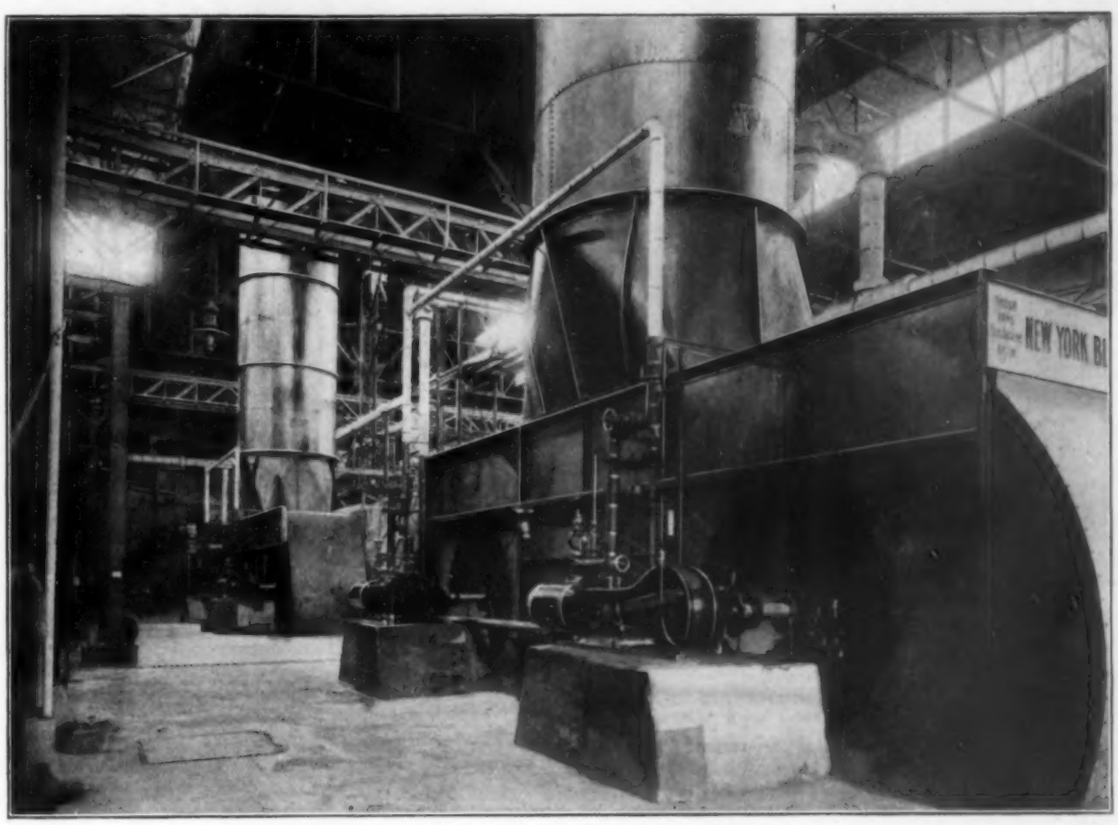
The three 2,000-h. p. Westinghouse induction motors which operate the Cascades pumps, estimated to have a capacity of 90,000 gallons of water a minute, are started very gradually at the advertised hours throughout the day and evening, the current being slowly raised to normal, the starting rheostats under Festival Hall, because of the exceptionally large size of the motors, having very many steps.

The four main units were described in *The Iron Trade Review* of July 28.

All main and exciter engines, as well as auxiliaries in Machinery Hall, operate condensing, two complete central condensing equipments being stalled, each of 7,000-h. p. capacity and serving one-half of the plant. They are of the Worthington elevated jet or "barometric" type, provided with entrainers and rotative "dry air" pumps for removing air from the condenser cones. Both horizontal and vertical types of pumps are in operation, one of the three being held creeping, and supported upon rollers to accommodate expansion and contraction. Entrained water collecting in the boiler room piping is drained out and automatically returned to the boilers by a steam loop and "Holly" gravity return, which may be seen in continuous operation in the boiler room.

A similar system of piping for the boiler room and pumping auxiliaries is connected to the boilers between the drums and main valves, so that steam is always available at the boiler house auxiliaries. These operate non-condensing, exhausting into two Cochrane open-feed water heaters which reclaim the greater part of the heat from the exhaust. In the engine room all auxiliaries operate condensing upon the main condensing system.

Steam is furnished by sixteen 400-h. p. Babcock & Wilcox watertube boilers of the forged header type, set two boilers in a battery. The tubes and drums are carried by steel frames independent of the brick setting. Two 10-in. loop steam mains, each connecting four batteries of boilers, deliver steam to the two 12-in. mains which carry steam to the main units in Machinery Hall. Each group of four batteries of boilers is served by an independent induced mechanical draft



MECHANICAL DRAFT PLANT IN THE STEAM, GAS AND FUELS BUILDING.

in reserve. In case of loss of vacuum an automatic relief valve allows the exhaust steam from the engine to escape through the roof. A motor-driven valve operated from the floor below by a switch controls the steam inlet to each condenser. Circulating water is supplied to the condensers by a centrifugal pump of the Worthington turbine pattern, direct driven by a Westinghouse compound engine. The hot water discharged into the condenser hot wells is not thrown away, but is cooled for further use in four specially designed cooling towers adjacent to the boiler room. A second turbine circulating pump elevates the hot water into the towers and, in falling, the temperature is reduced by evaporation, which process is further aided by forced draft from the fans located at the base of each tower and driven from the boiler room by a Westinghouse compound engine. A third turbine pump unit is held in reserve and may be employed on either condensers or cooling towers. Motor-driven valves operated by a switch from the floor control the outlet of each pump.

Two complete systems of steam mains, 12-in. in diameter, convey steam to the main engines. The mains are carried beneath the floor in pipe galleries, anchored firmly to prevent equipment. Each equipment is provided with two fans, each capable of operating the boilers at their full capacity. A damper, by means of which either bar may be cut in or out of service, is so arranged that, if desired, both fans may be run simultaneously.

The firing of the boiler plant is accomplished by means of Roney mechanical stokers, each group of four stokers in line being driven by a small Westinghouse standard engine, through suitable gearing. On the exposition grounds the production of smoke is discountenanced, and careful observations of the smoke from the stoker chimneys are made at intervals during the day's run, for purposes of comparative record.

In the design of the service plant, no important feature of a modern central station was omitted. The Niles electric traveling crane over the main engine units in Machinery Hall is of 40-tons with a span of 80 ft. It is equipped with three Westinghouse motors—one of 20-h. p. capacity to drive the bridge, being located at about the center of the girder, and two, one of 20-h. p. capacity for hoisting and one of 5-h. p. for moving the trolley, being secured to the trolley itself.

THE NEW SCHWARTZ FURNACES.

The Hawley Down Draft Furnace Co., of Chicago, has added some smaller sizes to its line of Schwartz metal melting furnaces. The Schwartz furnace is built in sizes ranging all the way to 10,000 lb. per heat. The fuel used may be either crude oil, fuel oil or gas. The furnace is lined with high grade fire brick tile for brass melting and silica brick for iron and steel melting. It is much like a Bessemer converter in general appearance, swings on trunnions and the charge is usually melted by a blast of oil and air through two tuyeres.

Fig. 1 illustrates the smallest size of Schwartz furnace with capacity from 10 to 100 lb. in 30 minutes. Figs. 2 and 3 are views of the Schwartz furnace having a capacity of 500 lb. in 45 minutes. It is claimed that the average amount of fuel used is 30 gallons of crude oil for every ton of metal melted.

Some tests have been made by the R. W. Hunt Co. at the Chicago, Rock Island & Pacific Railroad Co.'s shops. The tests as recorded cover six heats of a varied assortment of car bearing metal. The test started at 7:25 and 46 minutes were taken in heating the furnace. The total amount of metal charged in the six heats was 2,345.5 lb. and the quantity received 2,288.75 lb., the total shrinkage being 53.75 lb. or 2.29 percent. The total amount of oil used was 65.83 gallons. Heating the furnace consumed 9.50 gallons and the amount per hundred pounds of metal melted was 2.44 gallons. In a fifteen day test with metal for car bearings the total amount melted, time and oil consumed, were as follows: Red brass

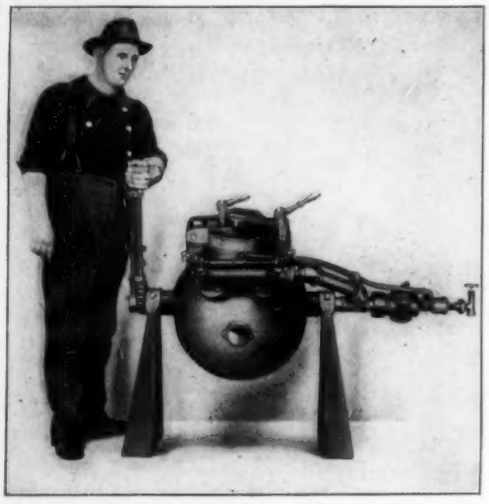


FIG. 1.—SCHWARTZ FURNACE OF SMALLEST SIZE.

borings, 33,000 lb.; scrap car bearings, 60,900 lb.; crude oil burned, 1,680 gallons; total hours, 120; number of heats, 54; cost of fuel oil, $58; labor in melting, $37,50; cost of steam power, etc., $11; loss of metal, 3.7 percent; gallons of oil per hundred pounds of metal melted, 1.8.

Another test made with kerosene oil fuel was reported as follows: Time to heat furnace, 45 minutes; time to melt 500 lb. bronze, 1 hour; oil used, 11 gallons per hour; cost of oil, 9c per gallon; loss of metal, 1.9 percent. The total cost of six heats in ten hours, using oil only seven hours which includes the heating of the furnace, takes 77 gallons and was $6.93 for melting 3,000 lb. of metal. The use of kerosene effects a much greater saving therefore than may be obtained by either crude oil or natural gas.

A test of a Schwartz furnace in making steel castings involved the melting of 350 lb. of Stewart pig, 819 lb. plate scrap, 8 lb. ferro-manganese and 40 lb. silico-spiegel, a total of 1,217 lb. The time from charging to tapping was 3½ hours and the crude oil used was 73.4 gallons.

New Railroad Equipment.

The following companies have ordered cars from the American Car & Foundry Co.: The Erie Railroad Co., 1,000 cars of 100,000 pounds capacity; an additional order from the Swift Refrigerator Transportation Co. for 100 refrigerator cars, making 300 refrigerator cars in all now being built for that concern. The following companies have ordered cars from the Pullman Co.: The Erie Railroad Co., 1,000 self-clearing hopper cars and 1,000 40-ft. twin hopper gondola cars. The Isthmian Canal Commission, at Washington, has asked bids on 1,000 steel dump cars and 500 standard flat cars of 80,000 pounds capacity to be used in the construction work on the Isthmian Canal; proposals must reach the commission by noon Oct. 20. The Tennessee Central Railroad Co., it

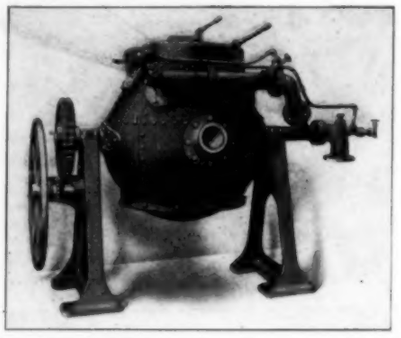


FIG. 2.—SCHWARTZ FURNACE, CAPACITY 500 LB. IN 45 MINUTES.

is rumored, is in the market for 700 cars, and the Canadian Pacific Railway Co., it is reported, is asking bids on 500 box cars. The Long Island Railroad Co. is considering the placing of an order for 125 steel passenger cars. The Delaware & Hudson Co. has ordered 100 composite steel coal cars. The New York, Susquehanna & Western Railroad Co. has ordered 100 cars and the Maine Central Railroad Co. 100 flat cars.

Bessemer Pig Iron Association.

J. G. Butler Jr., chairman of the Bessemer Pig Iron Association, states that on Oct. 1, out of 1902 stacks using Lake Superior ore and reporting to the association, 129 were in, and 63 were out. The daily capacity of the entire 192 stacks is 55,300 tons. The active capacity is 41,174 tons daily, and the idle capacity is 14,126 tons, showing an idle capacity on Oct. 1 of 26 percent—a decrease of 2 percent since Sept. 1. The idle capacity from the beginning of the year is as follows: January 1, 64½ percent; February 1, 38 percent; March 1, 28 percent; April 1, 14½ percent; May 1, 10½ percent; June 1, 20 percent; July, 35 percent; August 1, 41 percent; September 1, 28 percent; October 1, 26 percent.

The Cramp Steel Co., of Collingwood, Ont., has entered a suit against its president and others of its officers in Collingwood, Toronto and Philadelphia, for damages for alleged malfeasance. The company seeks the cancellation of

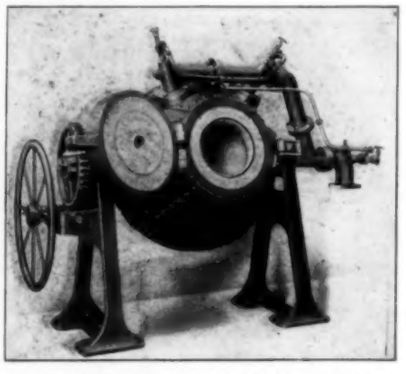


FIG. 3.—ANOTHER VIEW OF 500-LB. FURNACE.

preference shares valued at $100,000 and common shares of $200,000; for an injunction to prevent the officers from voting in the meantime upon these shares in any "pretended reorganization of the plaintiff company," and also for an injunction to prevent the transfer of the plant and assets of the plaintiff company to the Northern Iron & Steel Co., Ltd., of Toronto, or to any other company or individual.

USE OF MANGANESE IN CUPOLA OR LADLE.

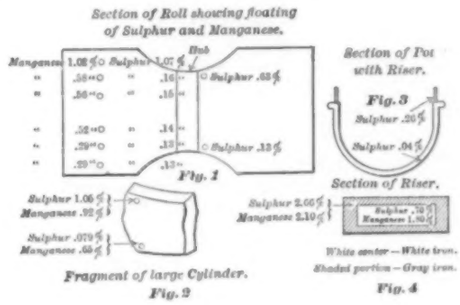
BY N. W. SHED.

The value of manganese in many castings is unquestioned. It makes a closer grain, and prevents the cutting action of many corrosive substances. Few of the ordinary pig irons go above one-half of 1 percent in manganese and to get a large percentage in the casting it is necessary to add a high manganese pig or spiegel to the cupola charge or else add ferromanganese in small lumps to the metal as it runs into the ladle. With hot metal several hundred pounds may be added in this way.

Foundrymen have usually said that it made little difference whether the manganese was added in the cupola or in the ladle, provided the ferro-manganese did not cost much more than the high manganese pig for the amount of manganese added. The question of cost will not enter the discussion, for there is very little difference in expense between the two.

To test the question whether it makes any difference in the castings, a number of heats were run by adding high manganese pig to the cupola charges, and a corresponding number were run by adding ferro-manganese in the ladle. When ferro-mangenese in large quantity, 200 to 300 pounds to the ladleful, was used, it was noticed that the manganese would combine with the sulphur present and carry a large amount of it to the top of the ladle. It would be possible to skim the ladle and thus reduce the sulphur considerably. The same thing is true in casting: the melted manganese seizes the sulphur and floats it to the very top of the casting.

This was proved in many instances; the most remarkable one was the difference between the bottom and top of a 2,000-pound roll. The surface of this roll was difficult to



machine and drillings made from the top of the roll showed 1.07 percent in sulphur and 1.02 percent in manganese. The roll was afterward broken and drillings made at intervals of a few inches from the top to the bottom. The results of the analysis of these drillings are shown in Fig. 1. The iron used in this roll averaged .05 percent sulphur.

In pouring heavy cylinders the same thing is noticed. Fig. 2 is a sketch of a fragment of a cylinder. The upper edge of the piece showed sulphur 1.05 percent with manganese .92 percent. Ten inches lower the piece showed sulphur .079 percent with manganese .65 percent. Again in pouring large pots the risers will often show .26 percent sulphur while the body of the pot will show but .04 percent sulphur as illustrated in Fig. 3.

On one or two occasions it was observed that these risers would show white iron in the center with well defined gray iron toward the surface as illustrated in the sectional view, Fig. 4. As this was a curious exception to the general rule, portions of each iron were tested for sulphur and manganese. The white interior showed .70 percent sulphur with 1.80 percent manganese. The gray exterior showed 2.66 sulphur with 2.10 percent manganese. When it was noted that this metal, normally, would not run over .06 in sulphur, this separation of the metalloid in the riser is remarkable.

These instances might be multiplied but they suffice to prove that ferro-manganese added in the ladle will float the sulphur to the top of the casting. On the other hand, when castings are made by adding high manganese pig to the cupola charges, no such action of the manganese is observed and there is no difference between the bottom and the top of the casting in sulphur percentage.

To avoid such irregular metal with its attendant hardness it would be well to abandon the practice of putting large amounts of ferro-manganese in the ladle. Small amounts of manganese to bring the manganese up .10 to .20 percent would do no harm and would correct any tendency to oxidation, and would give a closer grain to the casting.

At present high manganese pig, 2 to 3 percent manganese, can be bought from $1 to $2 per ton higher than ordinary pig iron, and by using 10 percent to 20 percent of this in a cupola charge, the iron is raised in manganese without the bad effect of floating the sulphur. In pouring high manganese metal a very beautiful display of metal in motion is noted. The surface seems to be covered with rosettes which continually change their position. Some speak of it as an oily film playing over the surface. It is probably caused by the action of the air on the film of manganese metal, but no explanation of it has come to the writer's notice.

In connection with the use of manganese it would be proper to state that most of the wonderful improvers of iron are nothing but alloys of manganese. Some contain considerable silicon, some have a little aluminum. A few ounces are supposed to make a good iron out of the poorest, and the promotors talk about life giving effects, regenerating influence and renovating properties. The effect is due to the manganese contained in the alloy.

A sample of one of these regenerators selling for 30 cents a pound was recently tested at the Foundryman's Laboratory. It contained about 20 percent of manganese. A spiegel of the same percentage could be bought for less than 2 cents per pound and would have the same effect.

If ferro-manganese were added to the cupola charge it would doubtless be better for the metal but there would be danger of the strong cutting action of the manganese upon the cupola lining, and also a great waste of manganese by oxidation at the tuyeres. For these reasons the use of high manganese pig in the cupola issuggested as the best practice. In air furnace castings the ferro-manganese has the same action as upon cupola metal and nearly all the manganese should be charged in the air furnace as high manganese pig.

[The experiments referred to were carried on by the courtesy of the Buffalo Foundry Co. which offered the use of its large ladles for the purpose. The ladles carried ten tons of iron in most of the trials. The air furnace pouring over 10 tons was also used, as well as the cupola. As the cupola metal made by this company never runs above .07 in sulphur this segregation of sulphur at the top of the castings was remarkable, and the Buffalo Foundry Co. was interested in finding the cause.—Ed.]

Mr. Schwab on Business Improvement.

Charles M. Schwab returned to New York from San Francisco the latter part of last week. After a few days in Pittsburg he will again sail for Europe in connection with business matters. Mr. Schwab was in a very optimistic frame of mind in regard to the iron and steel industry. He said: "The only thing I can say is that the turn for the better in the iron and steel industry has arrived. You will witness a general increase in production, and if 1905 is a poor year from the standpoint of iron and steel I will be very much surprised. I am not in a position as yet to make any statement in connection with the United States Shipbuilding Co. Of course there will be a reorganization of the personnel of the company. Western agricultural conditions could not be brighter."

Machinery is rapidly being installed in the new plant of the National Tube Co. at Lorain, O. The building of a sub-way under the main tracks of the Lake Terminal railway to afford the workmen an easy and safe passage to and from the plant, is now being completed. Ground was broken last week for a number of the first 500 of the 1,000 houses to be built near the tube mills at Lorain, by the Nicola Contracting Co., of Pittsburg. Three hundred men have been put to work on the new houses, most of the workmen are carpenters.

The people of Peoria, Ill., have subscribed $40,000 of the capital stock of the Carroll-Kilmer yielding barb wire enterprise. It is expected that $20,000 more will be raised before the company is organized and the construction of the plant begun.

CINCINNATI METAL TRADES ASSOCIATION.

The Cincinnati Metal Trades Association gave its quarterly dinner at the Business Men's Club, on Thursday evening, Oct. 6. The occasion was one of unusual interest and the attendance was large. Mr. William Lodge, of the Lodge & Shipley Machine Tool Co., presided as toastmaster in his usual graceful and entertaining manner. In his remarks at opening of the speaking Mr. Lodge said all present were fellow-workers along the same lines and had mutual interests, and were bound together in the sympathetic bond of mutual understanding in business affairs. He expressed his pleasure at the liberal response to the invitations, as shown by the number of those present—probably the largest gathering that the association had ever had at any of these functions.

In introducing Fred J. Miller, editor of the *American Machinist*, who was the first speaker, Mr. Lodge spoke of him as one whom he had first known as a machinist working in the shop, a self-made man. Mr. Miller spoke on "Innovation," and said that his address represented his views as an individual and not as reflecting the opinions or policies of the journal he represented. In substance he said that machinery men were purveyors of new ideas—successful new ideas—innovations. The embracing of new ideas was a disturbing factor; it had the effect of rendering valueless things which had had value. No other class of manufacture had so much influence on industrial affairs as the manufacture of machinery and the constant change, the discarding of old ideas and the taking on of new ideas, had great influence on the employment of men. The new idea which improved the efficiency of the machine, displaced workmen and reduced in value the old-idea machine. To keep up with this constant march of progress, it was necessary to approach all new ideas with an open mind, an attitude of calm judgment free from prejudice, and with charity for other innovators. Free expressions of ideas should be welcome. The speaker referred to the suppression of free speech in Russia and the consequent inability of her people to express themselves upon the tariff or other vital questions. He spoke of Japan as the great innovator. The broad-mindedness of her people and her government in seeking new ideas had led to great industrial improvement in that country. Japan has made greater industrial studies in the last fifty years than any country in the world.

In the shops, some men receive the new idea in an attitude of indifference; others embrace it simply because it is new; still others oppose any new idea. Each of these positions is wrong. The correct attitude is to study the new idea in all fairness, recognizing its advantages, criticising its faults, and applying unbiased, deliberate judgment and intelligence.

Prof. F. B. Dyer, superintendent of the public schools of Cincinnati, was next introduced. He spoke on the "Manual Training in Our Public Schools." Mr. Dyer said in part that he did not think it necessary to make an elaborate argument before such a body of men to prove that manual training in the public schools is a desirable thing. It had been introduced into the public school systems in all but three of the leading cities in the United States. All prominent educators believed in it and the time had come for Cincinnati to get into line and introduce this important feature in the school work, especially in connection with the high school course. He made the point that many parents kept their children out of the high schools, for the reason that high school education was designed to fit the pupil for a professional life, and the time spent in the high school could be employed to better advantage in making a start in some business pursuit. These parents held that the high school education, while desirable, did not compensate for the lack of experience in business life. He said the needs of civilization determine the educational needs, and the need of civilization was to turn out of the schools useful young men and women. He advocated furnishing the rudiments of manual labor in as many lines as practicable, but not to make trade schools such as are maintained in some countries of the old world. He did not believe in teaching watch-making, lock-making, china-making or any other specialty, but that a deftness of hand, a quickness of eye and the practical utility of tools should be taught so that the pupil would be equipped to make a start in almost any line of industry upon leaving the school. Mr. Dyer urged that influence be used with candidates for election to the board of education in order that they might see the necessity of introducing this important feature into the school system. He said these boards were composed usually of three classes of men: first, the theorist, the reformer, the visionary man, who was useless; second, the opportunist who was apathetic or anxious to be with the majority on any proposition, but who held no opinions or advocated none, an equally useless member; third, the man of practical wisdom, usually a business man, and this was the useful, forceful man and the man to reach with any meritorious proposition.

Mr. Lodge then introduced Mr. John Shearer, superintendent of the Ohio Mechanics' Institute, who also spoke on manual training. Mr. Shearer spoke of the necessity of the careful selection of teachers for manual training and gave examples of teachers who had presented themselves at the Ohio Mechanics' Institute, desirous of taking a limited course in certain branches of work in order to equip themselves to teach in these branches. He cautioned against the employment of such service as this to teach any branch of manual training. He advocated a more practical teaching of arithmetic in the public schools, and believed that instead of pupils merely doing sums they should be given a foot rule and be taught to use it and apply arithmetic in a practical way. He believed that many of the studies now in the school course were useless and could well be eliminated and manual training substituted with great benefit to the pupil. He believed that the needs of the community as a manufacturing center should be carefully studied, and as far as practicable the manual training in the public schools should be designed to be beneficial to the employing interest in the city as well as fitting the young men and women leaving high schools to take positions which might be open to them in the various industries.

The next speaker introduced was W. P. Eagan, the new commissioner of the National Metal Trades' Association, who spoke on the work of his association in the recent machinists' strike in Chicago. Mr. Eagan's address appears elsewhere in this issue.

E. F. DuBrul, ex-commissioner of the National Metal Trades' Association, begged the privilege of addressing those present. He called the attention to the existence in that city of a strike of the molders, and the efforts of the National Foundrymen's Association to get the foundries into operation with non-union men. He said that the machine tool men might naturally be expected to be somewhat embarrassed by the molders' strike, as the foundries would probably not be able to furnish castings promptly. He appealed to the machine tool men to be as lenient with the foundrymen as possible, not to go elsewhere for their castings except in cases of extreme necessity and to encourage as far as possible the foundries in making an effort to rid themselves of its unjust restrictions of labor unions. He said the foundrymen would appreciate such efforts and that ultimate benefits would certainly accrue to the machine tool men by pursuing such a course. He recalled how the machine tool men during their trouble had appreciated the indulgence of customers, and urged that this fact be not forgotten under the present conditions in the foundrymen's difficulty.

An excellent quartet furnished music during the evening, which added materially to the enjoyment of the occasion.

A neatly bound pamphlet, containing facsimile letters of indorsement of the work of the National Metal Trades' Association, was handed to each of the guests on leaving the club.

The following were present:

Geo. W. Krapp, American Fire Engine Co.
J. M. Robinson, J. M. Robinson Mfg. Co.
J. E. Hirst, J. A. Fay & Egan Co.
E. N. Atkins, Vice Pres. Warner Elev. Mfg. Co.
Fred. A. Geier, Cincinnati Milling Machine Co.
A. E. McClintock, Secretary National Founders' Association.
Chas. F. Waltz, Secretary Cincinnati Employers' Association.
F. B. Dyer, Superintendent Public Schools.
Fred J. Miller, New York, *American Machinist*.
E. E. Greenwald, I. & E. Greenwald Co.
Wm. Lodge, Lodge & Shipley Mach. Tool Co.
John J. Shearer, Superintendent Ohio Mechanics' Institute.
W. P. Eagan, Commissioner National Metal Trades Association.
Julian V. Wright, Dayton, O.
H. M. Norris, Bickford Drill & Tool Co.
Ashton B. Heyl, guest of H. M. Norris.
Edw. C. Grever, Edw. C. Grever & Co.

E. F. DuBrul, Miller, DuBrul & Peters Mfg. Co.
E. E. Williams, Secretary Receivers' and Shippers' Association.
C. R. Houston, George H. Houston, Houston, Stanwood & Gamble.
Joseph H. Hausfeld, Victor E. Tresise, Ohio Pattern Works.
W. J. Radcliffe, Schellenbach & Radcliffe.
F. E. LeBlond, R. K. LeBlond Machine Tool Co.
R. D. Betts, Lodge & Shipley Machine Tool Co.
Wm. Herman, Fosdick Machine Tool Co.
Geo. Langen, Cincinnati Planer Co.
L. G. Keck, Bickford Drill & Tool Co.
Will L. Finch, Secretary Cincinnati Industrial Bureau.
Frank Adick, Edw. C. Grever, & Co.
E. M. Chace, Cincinnati Milling Machine Co.
A. R. Murray, W. B. Chace, Cincinnati Shaper Co.
W. T. S. Johnson, Geo. F. Stewart, Clarence E. Mehlhope, Bradford Machine Tool Co.
Jas. H. Curran, Jas. H. Curran Co.
A. Streit, Streit Machine Co.
O. H. Broxterman, Steptoe Shaper Co.
Hy. Dreses, Dreses Machine Tool Co.
Geo. Otting, Steptoe Shaper Co.
S. C. Marbury, Bullock Electric Mfg. Co.
C. R. Gabriel, Cincinnati Milling Machine Co.
G. W. Stiegler, United States Cast Iron Pipe & Foundry Co.
W. H. Burtner, Jr., Cincinnati Planer Co.
Wm. A. Greaves, Greaves, Klusman & Co.
Chas. Pfau, Harry Beeching, Pfau Mfg. Co.
T. L. Greenwald, C. E. Greenwald, I. & E. Greenwald Co.
C. H. M. Atkins, Warner Elev. Mfg. Co.
E. B. Stanley, Watkins Laundry Machine Co.
A. M. Peck, Lynn Filter Co.
Emil Von Wyck, Von Wyck Machine Tool Co.
O. J. Shafer, Globe Pattern Works.
J. Dietz, Dietz Machine Tool Co.
Jacob May, Sebastian Lathe Co.
Oscar W. Mueller, Mueller Machine Tool Co.
E. H. Hargrave, Cincinnati Tool Co.
H. G. Frech, Asst. Secy. Cincinnati Metal Trades Association.
B. B. Quillen, Cincinnati Planer Co.
Robt. F. Bahmann, Blymer Iron Works Co.
H. C. Hoefinghoff, Bickford Drill & Tool Co.
T. H. Marbury, Schuchardt & Schutte.
C. Wood Walter, Cincinnati Milling Machine Co.
Murray Shipley, Lodge & Shipley Machine Tool Co.
Aug. H. Tuechter, Cincinnati Machine Tool Co.
Sherman C. Schauer, Cincinnati Machine Tool Co.
Wm. R. Wallis, New York, *American Machinist.*
Fred Holz, Cincinnati Milling Machine Co.
S. Anderson, The Cincinnati Shaper Co.
J. B. Doan, American Tool Works Co.
A. E. Robinson, American Tool Works Co.
J. H. Day, J. H. Day Co.
Frank H. Fritsch, Francis Fritsch Mfg. Co.
Louis E. Rechtin, Louis E. Rechtin & Bro.
Louis B. Weber, Lodge & Shipley Machine Tool Co.
Wm. T. Johnson, Wm. T. Johnson Co.
Isidor Rauh, Cincinnati Electrical Tool Co.
Robert Wuest, Secy. National Metal Trades Association.
Benj. Sebastian, Sebastian Lathe Co.
Sam. L. Moyer, Lunkenheimer Co.
David C. Jones, Lunkenheimer Co.
F. R. Lindsley, *Iron Age.*
J. D. Morten, *The Iron Trade Review.*
N. C. Lambert, United States Cast Iron Pipe & Foundry Co.
Robt. B. McGowan, John H. McGowan Co.
John W. Neil, John McGowan Co.
S. P. Egan, J. A. Fay & Egan Co.
Wm. P. Tuechter, Chambers Machine Co.

Iron Ore Shipments to Europe.

From present indications the shipments of iron ore from New York mines to Great Britain and Germany will be continued next year. The exporters are Witherbee, Sherman & Co., who made extensive shipments in June and July, amounting to over 50,000 tons of ore. Siegfried Pels, the Hamburg representative of the firm, arrived in New York last week to take up the matter of further shipments. He stated that the shipment of American ore to Europe could be carried on profitably provided the steamship companies treated the matter kindly. He states that the ore which has been shipped has been received with favor. There will, however, be no more shipments this year, as the canal from Lake Champlain will soon be unnavigable.

It is announced that the United States Cast Iron Pipe & Foundry Co. has arranged to handle the cast iron piping to be used for the water supply of Panama through the deep water harbor at Gulfport, Miss. The people of Mississippi are much pleased by this recognition of the facilities offered by the Gulfport harbor and are hoping that a large part of the machinery, supplies, etc., will pass through Mississippi enroute to Panama.

THE CHICAGO MACHINISTS' STRIKE.*

BY W. P. EAGAN.

TheChicago machinists' strike is of peculiar interest to the metal working trades for the reason that it was the first strike ever handled in a business-like manner by an association of employers. Early in 1903 the Chicago Metal Trades Association entered into an agreement with the I. A. of M. stipulating for the open shop but classifying machinists, limiting apprentices and providing for a minimum rate of 30 cents per hour for machinists, and 35 cents per hour for die and tool makers. The men employed in the shops were mostly union men, which is the usual effect of such agreements. In May of 1904, when the machinery industry was at the bottom of a depression, a demand was made by the machinists that the minimum rate of wages for machinists be increased to 32½ cents and for die and tool makers to 37½ cents. This demand was refused, the employers contending that the depressed condition of business warranted a decrease rather than an increase in the minimum rates. They offered, however, to submit the whole question to arbitration in accordance with the provisions of the agreement which I have mentioned. The machinists expressed themselves as unwilling to arbitrate the question unless the board of arbitration be instructed that under no circumstances was the minimum rate to be reduced. The employers contended that the the only theory upon which a board of arbitration can be employed in any case is that its members are disinterested, competent to get at exact conditions and apply whatever remedies those conditions warrant. They stated that they would be very willing to grant an advance should the board of arbitration decide that such advance was warranted after a thorough investigation of all the facts and conditions, but that should investigations show that a decrease in the minimum rate was warranted, the men would be expected to abide by the award. This the machinists declined, and we have another record of a broken agreement against them. They probably hold the same views as Cornelius P. Shea, the international president of the Brotherhood of Teamsters, who said, "I do not regard anything as a violation of an agreement which has for its object the maintainance of union principles."

Negotiations were broken off and strikes were called in a number of shops during the last week in May. By the end of the first week in June strikes were in progress in 34 shops, 11 of which are operated by members of the National Metal Trades Association, and all of which are enrolled in the membership of the Chicago Metal Trades Association. During the first week in June, a temporary office was opened by Mr. Wuest as secretary of our association, and the necessary preliminary steps taken to handle the situation. A meeting of the district committee was called, and it was decided first to fill the shop of the C. F. Elmes Engineering Co., whose men were the first to go out on strike. As many of our special certificate men as could be gotten together were hurried to Chicago. These men, each one accompanied by the superintendent or a foreman of one of our members, were sent out to secure recruits.

The cities of Milwaukee, Detroit, Cleveland, Pittsburg, New York, Philadelphia, Baltimore, Hartford, Indianapolis and several other smaller places were thoroughly covered. Men were sent only to cities where our records showed that there were an unusual number of unemployed mechanics, and to cities where the membership in our association is least numerous as compared with the total number of shops employing machinists. Our men were instructed not to engage "strike breakers" or men who merely wanted work during the existence of the strike. They were also instructed not to engage men who were already employed. The secretaries of local associations throughout the country and our membership at large were appealed to and men began coming into Chicago. The labor bureaus operated in connection with the local associations proved of great value to us. The system employed in engaging men is one that has been evolved through our considerable experience in work of this character. Each man, upon being employed, was required to sign a statement to the effect that he had been informed that a strike was in progress in the shops named, and that he was willing to go

* An address before the Cincinnati Metal Trades Association, Oct. 6, 1904. Mr. Eagan is commissioner of the National Metal Trades Association.

to work under such conditions. In cases where men were not able to pay their own transportation (and these cases were by far the most numerous) they were required to sign a contract, stipulating that the cost of the transportation advanced should be deducted from their wages, one half the first pay day, and the balance the second. It was stipulated that at the end of 60 or 90 days depending upon the amount of transportation advanced, the sum so deducted would be refunded to the employe providing he had rendered faithful service during that time. The men we sent out were instructed to accept only men having a reasonably good outfit of tools, it being argued that a mechanic of ability will almost always have tools of sufficient value to afford indemnity for transportation advanced. Tools were required to be deposited and checked through as baggage, the checks being mailed to Mr. Wuest in Chicago, and by him delivered to the employer to whom the man was assigned. The references of each man were carefully investigated before he was employed.

It is pleasing to note that nearly every railroad over whose line the men were taken into Chicago granted special rates for their transportation. On their arrival in Chicago these men were all met at the station and taken to a hotel with which special arrangements had been made. After visiting the office, and again being interrogated as to their special qualifications, by Mr. Wuest, they were sent out under guard to the shops to which they were assigned. It may be well to say here that before any men were brought into Chicago each member was required to make such arrangements as necessary to provide a boarding place for the men working in his shop. We are to be congratulated upon not having found it necessary in a single instance to house men in the plant.

The system as I have outlined it proved very efficient. Blanks were devised to take care of the most minute details, and such blanks now form a part of our regular equipment. In this connection I can not compliment Secretary Wuest too highly for the working out of many of these details and the most excellent work performed by him during his stay in Chicago while the strike was being contested. Less than 10 percent of all the men employed for Chicago failed to arrive there and to work a reasonable length of time. This is a record never approached in work of this kind. Over 75 percent of these men are at work today, and will retain their positions so long as they care to hold them, and there is work to be done. Many of our members report greater productions per operative than they have ever before known, and several of them have stated that they had absolutely no conception of the extent to which their production was being limited. Throughout the strike and up to the present time, the most vigorous picketing has been indulged in. During the earlier part of the fight, several assaults occurred each day. The assailants when they could be discovered were vigorously prosecuted, and uniformly fair treatment was encountered from the police and in the justice courts. Men were severely fined for intimidation, and the use of the word "scab," injunctions were secured in a number of cases, but their effect was not what was expected despite the fact that they were probably the most sweeping injunctions granted in similar cases.

The greatest expense was the employment of special police as guards, it being absolutely necessary to escort all the men from their boarding house to the shop each morning and back again at night in order to save them from assaults by the ever ready pickets. This has been the practice for four months, and we have no means of knowing how much longer it will have to be continued. If our experience at Quincy, Ill., where picketing has been continued for a year and a half and still continues, is any criterion, we may expect to maintain these guards in Chicago for a long time to come.

A great deal of routine work in connection with the strike consisted in transferring men from shop to shop, until they were located in the positions for which they were best fitted. It will be understood that with the hundreds of positions to be filled and the corresponding number of men coming in, it was in many cases necessary to try a man in several different places, before the position he was best fitted for was found. Great care was taken in this matter and the utmost patience exercised. It was felt that these men must be given every opportunity of proving their ability and fitness for employment. Every encouragement was given them and everything possible done to convince them that the association was interested in their welfare, and would stand back of them in every respect. Many men have been granted certificates of recommendation in consideration of services rendered during this strike. These certificates are more highly prized by workmen as time goes on, who realize that they are far better than any union card they can get; that no dues or obligation of any sort other than to conduct himself as a faithful, law abiding citizen, is required, and the holder is practically assured of a position at all times.

The net results of the strike has been the most crushing defeat that has ever been administered to any district lodge of the International Association of Machinists. Of the 1,400 men who went out on strike, less than 20 have got back to work. This will go very far toward teaching men that they cannot leave their positions and still have them. The belief on the part of members of unions that they can do this is the thing that causes hasty strikes. They must be made to understand that while they have the right to quit their employment, having done so the positions no longer belong to them. It is astonishing how strong this opinion is. I have heard even non-union men say that they would not take another man's position, notwithstanding the fact that the other man had left his job three months before and had disappeared. It was stated by these men that the position was still his.

The machinery manufacturers of Chicago are enthusiastic over the results which have been obtained, and the necessity of organization handling such matter, has been more thoroughly demonstrated than ever before.

The experience of one year working under an agreement, demonstrates that an agreement of any sort tends to encourage union men and discourage non-union men. This is particularly true when any of the standard objectionable clauses of the union men are inserted. The effect is to materially aid the union leaders in coercing free workmen to join their ranks. After the Chicago agreement had been enforced for nearly a year the shops of the members of the Chicago Metal Trades Association were nearly all unionized.

As this is the first time I have had the pleasure of being with the Cincinnati Metal Trades Association on one of these occasions, it seems appropriate for me to say that I am highly gratified with the way I have been received in Cincinnati and the cordial and pleasant relationships which have been established between myself and Cincinnatians with whom I have come in contact. I feel that it will be pleasant to live and work among and with you. Your organization has been held up as a model all over the country, and the fact that it remains intact, while the apparent need of the organization does not seem to exist, thus demonstrating that you are not a storm organization which only comes into life as a refuge in case of trouble, is testimony that you appreciate the value of the moral influence which the existence of the association has. It is a necessity that employers remain fully as alert as the unions in maintaining their organization. In this connection I desire to call attention to the fact that the machinists' union has recently revised its constitution so that any person working in a machine shop and engaged in any manner with the making and repairing of machinery may become a member of the union. This means that any man working in a shop in any position whatever, whether he works a day or a year is eligible to membership in the union. Eternal vigilance is the price of industrial peace, and this fact must be constantly borne in mind.

The firm of Jones, Cæsar & Co., accountants, Chicago, has changed its name and is now Jones, Cæsar, Dickinson, Wilmot & Co. The constitution of the company remains unchanged, the partners being A. Lowes Dickinson, H. W. Wilmot, C. J. Marr, George O. May, and associated with them in the general management of the business are Edward Stanley and George R. Webster. The firm has done considerable work in iron and steel circles and the preparation and installation of practical cost systems has for some years been an important part of its accounting practice.

The Bay View Foundry Co., Sandusky, O., recently incorporated, will take over the foundry business of the Sandusky Foundry & Machine Co.

PERSONAL.

Walter Fitch, Beacon, Mich., who is shortly to conclude a 30 years' residence in Marquette county and go to Utah to take the general management of the mines and smelters of the United States Mining Co., was the guest of honor at a banquet given on the evening of Oct. 6 at Marquette by a representative company of friends and Upper Peninsula mining men. Mr. Fitch for many years was agent for the Champion Iron Co. operating the Champion mine and was one of the best known of Lake Superior iron mining men. The banquet was made the occasion of the presentation to Mr. Fitch of a beautiful sterling silver dinner service of 12 pieces, elaborately engraved. M. J. Sherwood was the toastmaster. Toasts were responded to by Hon. J. W. Stone, Hon. H. O. Young, of Ishpeming; William Kelly, of Vulcan; James Russell, James MacNaughton, M. M. Duncan, of Ishpeming, and Gad Smith. Those present were: Hon. J. W. Stone, D. W. Powell, Gad Smith, Joseph Fay, M. J. Sherwood, F. H. Begole, D. H. Ball, H. R. Harris, F. J. Jennison, A. E. Miller, G. N. Conklin, Dr. T. M. Cunningham, D. F. Charlton, A. O. Jopling, T. H. Noble, James Russell, John M. Mangum, W. S. Hill, J. R. Van Evera, F. A. Bell, Geo. J. Maas, Thomas Connors, W. H. Johnston, A. B. Miner, H. O. Young, A. J. Yungbluth, J. E. Jopling, M. M. Duncan, D. T. Morgan, Mark Elliott, J. C. Greenway, Dr. J. Vandeventer, M. C. Quinn, D. McVichie, J. H. Rough, C. F. Sundstrom, O. C. Davidson, James MacNaughton, William Kelly, Dr. H. W. Hornbogen and C. R. McCabe. A farewell reception was given last week by Mr. and Mrs. Fitch at their home in Beacon, which was largely attended by friends from Beacon, Ishpeming, Negaunee and other Michigan cities. Mr. Fitch will be accompanied to Salt Lake City by his family, with the exception of his sons who are attending the Michigan School of Mines.

Arch. M. Loudon, of Abendroth Bros., Port Chaster, N. Y., and N. B. Payne, of the Payne Engineering Co., Elmira, N. Y., have leased the foundry of the Payne Engineering Co. and are now manufacturing iron and brass castings under the style of the Payne Foundry Co.

Joseph T. Ryerson & Son, Chicago, announce the appointment of the Abner Doble Co., San Francisco, as their Pacific coast representative.

F. G. Adamson, of the Stephens-Adamson Mfg. Co., manufacturer of belt conveying machinery at Aurora, Ill., sailed last week for Europe, on business.

George H. Lowe, superintendent; his assistant, Robert O. King; and A. W. Thorpe, foreman of laborers of the Fort Wayne Iron & Steel Co., Fort Wayne, Ind., have resigned. Messrs. Lowe and King will go East, and Mr. Thorpe returns to Muncie. To fill the first two vacancies A. W. Tyler has been appointed superintendent and J. M. Lewis assistant superintendent. Both are from Muncie. Before the retiring officials left Fort Wayne the employes of the company gave a smoker at which Mr. Lowe was presented a diamond ring, Mr. King a gold watch and Mr. Thorp a silk umbrella.

E. W. Tetlow, who has been connected with the Home Rubber Co. for a number of years, is now with James Bonar & Co., Inc., Frick Building, Pittsburg.

C. F. Dickinson, for a number of years manager of the Riverside Bridge Co., Martins Ferry, O., has resigned. His successor has not yet been appointed.

Joseph Glover, assistant superintendent of the 10 and 23-in. plate mills of the Homestead plant of the Carnegie Steel Co., Pittsburg, has resigned to accept a position with the Lackawanna Steel Co., Buffalo. He was presented with a gold watch by the employes of the mill.

At a banquet of the mine superintendents employed by the Pittsburg Coal Co., held at the Hotel Henry, Pittsburg, on Wednesday, Oct. 5, president Francis L. Robbins spoke in part as follows: "Immense corporations of the country must set the pace for the future relations between capital and labor, and the joint trade agreement between employer and employe is the only means by which industrial peace can be maintained. The Pittsburg Coal Co. was the first to recognize the changed industrial conditions of the last few years by making employes partners in the company. The company was the first to realize that employers and employes must meet on equal terms and that friendly relations must prevail between both. The company early realized that great corporations, developed in the last few years with startling rapidity, must set the pace for others in the matter of relations of capital and labor. We, the greatest single power in the bituminous coal industry, were in position to fight the workingmen and the unions, but early decided the policy of friendly relation that each should hold. The joint trades agreement between employer and employed is the only means by which industrial peace can be secured and maintained."

N. V. F. Wilson has resigned as district manager of the American Sheet & Tin Plate Co. in charge of the Aetna-Standard plant at Martin's Ferry, O., and has been promoted to the position of assistant to Vice President Eugene L. Pargny in charge of sales. Harry L. Cooke succeeds Mr. Wilson as district manager.

Henry C. Frick was this week elected a director of the Philadelphia & Reading Co. and all of the subordinate companies of the Reading system to succeed to the vacancy caused by the death of J. Louber Welsh.

Andrew Carnegie sails from Liverpool to New York on the Celtic on Friday, Oct. 14.

Obituary.

Oliver Partridge Dickinson, credit manager for Crane Co., Chicago, died Wednesday, Oct. 5, after an illness of a month's duration. He was born in Wilkesbarre, Pa., in 1844. He went West and was educated at the University of Michigan, graduating in 1866. He became vice president of the Merchants' National Bank of Kansas City and later came to Chicago. Mr. Dickinson was one of the organizers of the Illinois Club, and was a member of the Society of Colonial Wars and of the Illinois Society of the Sons of the American Revolution. He is survived by a widow.

Dissolution of the Field-Evans Iron Co.

The stockholders of the Field-Evans Iron Co. held a meeting in the general offices of the company in Cincinnati on Oct. 10, and voted to go into liquidation at once. Robert Field was elected trustee for the stockholders and under his direction the affairs of the company will be completely wound up. Mr. Field as trustee will retain the offices of the company in the Traction building and will continue to act as agent for the Sloss-Sheffield Iron Co. and the La Follette Coal, Iron & Railroad Co. All of the other offices of the company will be closed. These are in Chicago, St. Louis and Pittsburg. The above action was caused by dissensions and misunderstanding among the principal stockholders. The financial affairs of the company are reported to be in good condition.

Liquid Fuel for the Navy.

The report of the "Liquid Fuel" Board of the United States Navy covers 450 7¾ x 11½ in. pages. It is freely illustrated and is one of the most complete and practical expositions of oil fuel possibilities yet in print. Issued as a Government publication and under the auspices of the Bureau of Steam Engineering, Navy Department, it may meet the fate of many other reports and be generally overlooked. A letter to any congressman, particularly at this pre-election time, would probably secure a copy.

A Berlin press cablegram announces that the German Steel Syndicate is holding conferences at Cologne with the British, French and Belgian producers. So far as learned the American steel makers are not represented. No Americans were present at the public dinner given to the delegates. The conference, it is reported, related to an international selling arrangement, but the proceedings were kept strictly secret.

The Titusville Forge Co., Titusville, Pa., suffered only small loss from the recent fire in its plant. The necessary repairs were completed in a few days and the plant started in full. Every department is now in operation.

The Cloverport Machine & Foundry Co., of Cloverport, Ky., has reorganized and elected the following officers: J. A. Barry, president; J. W. Pate, vice president; M. Weatherhoit, secretary and treasurer.

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades and Iron and Steel Manufacture.

PUBLISHED EVERY THURSDAY BY

THE PENTON PUBLISHING CO.

CLEVELAND, OHIO.

CHICAGO - - - - - - - 1164 Monadnock Block.
PITTSBURG - - - - - - - 429 Park Building.
NEW YORK - - - - - - - - 150 Nassau St.

Subscription, $3.00 per annum. To Foreign Countries, $4.00.
Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER.

OCTOBER 13, 1904

THE BY-PRODUCT COKE INDUSTRY.

Increased interest has attached to the statistics of coke production in the United States in the past few years, or since the iron trade began to watch the growth of the by-product coke industry. Including the production of coke from retort ovens, the total output in the United States in 1903 amounted to 25,262,360 net tons as compared with 25,401,730 net tons in 1902. Of the 77,188 active ovens in 1903 there were 1,956 by-product ovens which produced 1,882,394 tons, or an average of 962.4 tons per oven. The average output of beehive ovens was 311 tons.

There has been a steady increase in by-product coke production in this country. The total of 1,179,900 tons in 1901 was increased in 1902 to 1,403,588 tons and in 1903 to 1,882,394 tons. The percentages of the total production of coke in these years furnished by the by-product ovens were respectively 5.4, 5.5 and 7.4. Not only did the by-product ovens yield more than three times as much in the year as the beehive ovens, but as is well known the yield of coal in coke is greater in the case of the by-product oven, being 72.25 percent, as against 64 percent for all the coke ovens of the country. Probably the actual average for beehive ovens is not above 60 percent.

The predictions of rapid development for the by-product coke industry in 1903 were not entirely borne out, largely because the 1,128 ovens which were projected for the Lackawanna Steel Co.'s plant at Buffalo were not completed in that year as was expected. The number of completed retort ovens increased from 1,165 in 1901 to 1,663 in 1902 and to 1,956 in 1903. At the end of last year there were 1,335 retort ovens building, including those at Buffalo, while the number of beehive ovens in construction at the close of 1903 was 4,940. Thus the retort ovens building were 21 percent of the total under construction. With a total of 3,291 retort ovens active—this number including the 1,335 ovens building at the close of 1903—their production at an average of 1,000 tons per oven per year would amount to 3,291,000 net tons of coke, which is 13 percent of the total coke production in the United States last year. Operated steadily through the year, excepting idle time for repairs, this number of by-product ovens would actually produce 4,000,000 tons of coke, or nearly one-sixth of last year's output.

As chief of by-products, the annual yield of tar on this tonnage of coke would be about 250,000 tons and that of ammonia sulphate about 55,000 tons. The value of all by-products of the above number of ovens, exclusive of gas, might be put in the neighborhood of $4,000,000.

The question has been raised at times whether the increase in the amount of by-products put upon the market would not cause a decline in prices, involving a considerable discounting of the advantages generally held out to the investor in retort ovens. One consideration in this connection is that the United States is still an importer of coal tar products and therefore offers considerable room for the expansion of home industries yielding such products. Of coal tar colors and dyes our imports in the fiscal year 1902 were valued at $4,951,346; in 1903 their value was $5,304,695, and in 1904, $4,918,503. In alizarin colors and dyes the imports were valued at $1,027,026, $659,835 and $636,702 respectively. The totals of the two items were about equal in 1902 and 1903, while in 1904 there was a falling off of over $400,000—some indication that home products were increasingly felt.

In an article on fuel briquetting, in the last issue of *Mines and Minerals*, Mr. John Fulton suggests that this industry will require an increased quantity of pitch in its various forms as a binder. The briquetting plants which have been operated heretofore have had little success and mainly on account of the excessive cost of pitch. Considering that important interests are behind the development of by-product coke manufacture in the United States it would seem natural that the two problems should be solved together and that the price of tar should eventually be such as to make it an object to establish fuel briquetting plants.

THE IRON ORE SITUATION.

It has been a matter of comment among buyers of iron ore in the past six months that there was very little difference between prices quoted by various selling firms on ores of similar analysis and physical characteristics. Predictions of demoralization, which were freely made when it was decided to have an open ore market in 1904, have not been borne out by actual transactions. It is a noteworthy fact that sales have been made through the season within 15 cents to 20 cents a ton of the prices which the strictly merchant ore firms advocated at the conferences held in Cleveland and New York last April. The fairly uniform prices secured have been due not at all to agreement among sellers, for there has been none, but rather to the fact that these prices made the business practically profitless. At best the margin was very meager, as compared with what has existed in the past three years. While a $3.25 price for old-range Bessemer ore, running 63 percent in iron, .045 percent in phosphorus and carrying 10 percent moisture, was favored by the merchant ore men, sales of ore of similar analysis have been made in the vicinity of $3.05 to $3.10. Similarly, old-range non-Bessemer ores of 60 percent iron and 12 percent moisture were figured at $2.80 to begin with, and in the market have brought $2.65 to $2.70.

The feeling has been general among ore producers that it was not good policy to throw away any of the

money earned in recent years, by demoralizing the market in 1904. It has been generally considered that one season of light shipments would be sufficient to correct the bad adjustment of supply and demand which had resulted from the over-shipments of 1902 and 1903. Meantime producers were willing to accept a year of small business and look to 1905 to give them both profits and a fair tonnage. It can readily be seen that such a condition makes an agreement among the merchant ore firms in 1905 more of a possibility than was generally supposed when the ore association dissolved last spring. There has been no slaughtering of the market, and there will be no heartburnings to stand in the way of an amicable discussion early next year of the feasibility of renewing the old agreement, with such changes as may be necessitated by the increasing importance of the producing consuming interests.

There is a marked contrast between such a season as 1904 and the years immediately following the panic of 1893. In the past ten years Lake Superior ore interests have been passing, year by year, into strong hands, and there is now no such experience as used to be common when weak producers, in order to meet obligations, would force their stockpiles to sale, and always at sacrifice prices. There is throughout the entire Lake Superior district a very distinct recognition today of the value of every ton of iron ore in the ground. In the old days those who were trying to stiffen the backbone of weak sellers used to urge with great vigor that ore once taken from the ground could not be replaced, and that to sacrifice it was weak and foolish. Such urging is not needed today. The value of iron ore as a world commodity was never better understood. The years that do not bring a good return to owners of iron mines will be the exceptional years.

While the movement of ore from Lake Superior this year is light as compared with the two years preceding, the average of which was close to 26,000,000 tons, the total for 1904 will exceed considerably some of the early estimates. Shipments of 18,500,000 tons now seem well assured, and the total may run to 19,000,000 tons, saying nothing of the Baraboo district, which sends ore direct to South Chicago, and the Michipicoten district, which, however, will be a relatively small contributor this year. At the opening of navigation on May 1, 1904, there were about 9,500,000 tons of ore on Lake Erie docks or in furnace yards of users of Lake Superior ores. Adding 19,000,000 tons gives a total of 28,500,000 tons available for the year ending with the opening of navigation in 1905. It would be safe to estimate that the stocks on hand at docks and in the furnace yards will be between 6,000,000 and 7,000,000 tons on May 1 of next year; and in the evolution of the Lake Superior ore trade from a 10,000,000-ton movement only eight years ago to a time when shipments of 30,000,000 tons are counted on as a probable record of one or two seasons hence, such a stock at the opening of navigation is a very moderate factor of safety.

The first week of October has developed a fact of great importance in the increased consumption of refined copper by American industries. For six months, melting of copper in the United States was reduced far below normal. To appreciate this fact it should be remembered that the normal is upward of 22,000 tons monthly, but recently consumption fell to 14,000 tons monthly. Within the last month, however, it has advanced to 18,000 tons per month, making an average of 16,000 tons for the first three quarters of the year, but the unprecedented exports of copper up to the present time have more than counterbalanced the decrease in home consumption. Within the last two weeks very heavy contracts for copper have been placed for both domestic and foreign consumption, making it positive that during the last quarter of the year the combined needs of domestic and foreign melters will exceed the current production and imports together, making a draft upon surplus stocks necessary. Fortunately for consumers, however, there is an ample supply of surplus copper indicated by recent Government statistics, which show that on the first of January between 80,000 and 85,000 tons of copper was available in this country over and above the metal in process of refining and in dealers' and consumers' hands. These stocks have been reduced somewhat during the past three months and the next quarter will draw the reserves down fully 6,000 tons more so that we are likely to go into next year with a stock close to 70,000 tons.

The Government crop report is very encouarging and will do much to allay the fears occasioned by the shrinkage in wheat. The present advices suggest that the crop of corn will be with two exceptions the largest for the past ten years. With a crop of something like 2,350,000,000 bushels and a record breaking cotton yield there is every expectation of good business for the winter despite the shortage in wheat.

Pig Iron Inquiries at Pittsburg.

(Special Telegram.)

PITTSBURG, Oct. 12.—Inquiries are out for 25,000 tons of foundry iron for Pennsylvania tunnel castings. The Pearson contracting firm is to buy the iron, a previous deal covering castings and iron having fallen through. There are inquiries in the market for about 12,000 tons of forge iron. One interest wants 8,000 tons of this amount.

A large supplementary order for machine tools to be installed in the Rock Island arsenal has just been placed with Manning, Maxwell & Moore, who have also obtained a contract for two five-ton electric traveling cranes to be used in the Obuchoff Arsenal of the Russian Government, as well as an order for two large Shaw cranes for the Southern Railway Co., and two five-ton electric cranes for the American Car & Foundry Co.

The O'Rourke Construction Co., which is in charge of the North river tunnel, has awarded the order for suction pumps to the Blake & Knowles Steam Pump Works, and that for the oil separators and water heaters to F. E. Idell, of New York.

The Lidgerwood Mfg. Co. has secured a contract for four electric hoists to be used in the construction of the Quebec Bridge over the St. Lawrence river, and has also obtained an order to finish the electric shaft hoists and cages which are to form the entire elevating outfit for the shafts of the North river section of the Pennsylvania railroad's tunnel in Weehawken, N. J., and at the foot of West Thirty-fourth street, New York City.

The Maud S. Pump & Windmill Co., Lansing, Mich., has increased its capital stock from $40,100 to $67,100. The increase is due to the company enlarging its business by taking up the manufacture of gasoline engines.

The Labor Situation.

THE CINCINNATI MOLDERS' STRIKE.

There is no likelihood of the foundrymen and the molders' union coming together with a view to settling the Cincinnati strike. The National Foundrymen's Association is making better progress every day in filling the shops with non-union men and all of the foundries are now able to run. The temper of the employers is to stand firm for the open shop and the situation from their standpoint is said to be better today than at any time since the beginning of the strike. Last week one of the non-union men was killed on the street, the attack upon him being due to the fact that he was a strike breaker, but since this encounter no further rioting has been reported.

ANOTHER VICTORY FOR THE OPEN SHOP.

A year ago last June the woodworkers of Chicago went out on strike because of the refusal of employers to sign the union agreement. In 26 shops 1,800 men struck. The proprietors of fifteen other factories signed with the union and reopened, while the balance concluded to get new men and fight for an open shop. The struggle has continued since that time, the plants starting slowly at first, though additions were made to their working force each week until all were running full time. Last week the union officials recognized their defeat and secretly advised their followers to go back to work or seek employment elsewhere. All who were taken back had to destroy their union cards and sign individual agreements with their employers. The union is now broken and the strike at an end.

LABOR NOTES.

A national strike of metal lathers against the Roebling Construction Co., of New York, has caused the workmen on four buildings in Philadelphia to quit work. The men claim that the company has broken its agreement by employing laborers to do a part of the work guaranteed to the Metal Lathers Union men. About 60 men are on strike in Philadelphia.

The strike of the structural workers at the Driggs-Seabury Ordnance Co.'s plant in Sharon, Pa., was settled October 6, the company granting $4.00 per day, time and one-half for over time and double pay for work on Sunday.

A man supposed to be Ed Hedrick, of Chicago, and bearing credentials of the National Metal Trades' Association, was arrested on the night of Oct. 5 at Quincy, Ill., on a complaint of the Quincy Engine Co., which charges him with surreptitiously wrecking the main lathe of the plant, necessitating a shutdown for several days. The man made a confession admitting that he put files in the teeth of the machine; that he was passing under an assumed name; that he was James C. Smith, a St. Louis machinist, and that the real Hedrick had been waylaid and his credentials used to further a conspiracy to wreck the Quincy Engine plant. Union machinists are on strike at Quincy.

The Machinists' Union of Rochester, N. Y., has given up the struggle against the W. P. Davis Machine Co., of that city. The strike was declared about a year ago. It was fought bitterly in the courts and resulted in complete victory for the company.

Notice was posted on the doors of the Chicago & Erie Railroad shops, Huntington, Ind., Oct. 7, that on account of strike conditions the shops would be closed until further notice. The shutdown is the result of a sympathetic strike of the boilermakers. The strike of the boilermakers of the railroad at Galion, O., has been resumed. Machinists in shops in several other cities in which this company has plants are also idle.

A strike is in progress at the plant of the Downey-Wright Mfg. Co., York, Neb., manufacturer of grain elevator and mill machinery. The trouble was caused by defective castings.

W. P. Eagan, commissioner of the National Metal Trades Association, in the association's "Monthly Letter" for October says: "The quarterly report of the number of operatives employed by our members, indicates no material falling off in the number of operatives reported for the preceding quarter, and the last two months of the quarter indicate that more men are being employed and that business conditions are improved. The indications point to a very material betterment in the existing feeling, and there is no question about our having passed the low water-mark of depression." The "Monthly Letter" is a new feature with this association. It consists of eight printed pages of reports and comments on the work of the organization and on labor developments in various localities.

The metal workers' strike at San Francisco has been declared off. The trouble has been of long standing. On May 1 the metal workers declared a strike in the downtown shops, asserting that they were violating union rules. The employers joined hands with the Citizens' Alliance against the strikers. Nearly all the firms concerned secured men enough to run their shops after the first two or three weeks.

Some readjustments have been made in the wage scale of the tonnage men employed in the Joliet, Ill., mills of the Illinois Steel Co. What the percentage of the reduction amounts to is not known, although officials of the company say it is in line with the reductions in the price of the product of these mills. The newspaper reports covering the changes in these schedules are somewhat misleading. All the men have expected a reduction at the expiration of their contract made in October, 1903, in view of the fact that the day and hour men employed at these plants suffered a reduction Jan. 1 last. The present contracts with the tonnage men employed in the rod mills will expire next month, and some reductions will also be made in their schedule for the coming year.

At the trial in New York of Phillip Weinseimer, formerly president of the Building Trades Alliance, who is charged with extorting $2,700 from George Essig, a contractor, George F. Johnson, of the firm of Johnson, Kahn & Co., the contractors who erected the Chatsworth Hotel in Riverside drive, told in detail of an alleged attempt by Weinseimer to obtain from him $2,000 on the Chatsworth contracts, of his refusal to pay the amount and the subsequent strike on the plumbing contract. The trial is still in progress.

Shipbuilding on the Great Lakes.

There are now twelve freight vessels, one passenger boat, and two car ferries under contract to be built during the winter at lake ship yards. Two of the steamers are 500 ft. over all, six are more than 500 ft., one is 360, one is 408, one is 400, and the length of one has not been announced. The material required by these vessels will be nearly 3,500 tons each. The American Shipbuilding Co. has contracts for eight, the latest order having been placed by Mrs. Anna C. Minch, Henry Steinbrenner and others, of Cleveland, for a vessel 500 ft. over all. The Great Lakes Engineering Works, Detroit, has contracted to build four steamers and a car ferry, the latest order having been placed by G. A. Tomlinson, of Duluth, for a vessel 500 ft. over all. The Craig Shipbuilding Co., Toledo, will build a turbine passenger and a car ferry.

In addition to the above orders, several other vessels are being figured on and the United States Steel Corporation is understood to be considering the building of from two to six freighters. The corporation has not announced its decision, but will probably do so in a few days.

Steam Regeneration for Rolling Mill Engines.

Prof. Rateau, of Paris, has invented a regenerative apparatus for steam plants which has met with much favor abroad. It is intended for engines working intermittently, such as rolling mill engines, and the apparatus absorbs steam from the exhaust and gives up the supply when the engine is at rest. This evens the flow from the engine and the low pressure steam is used in a turbine for auxiliary work. It is claimed that the plants in use or under contract on this system represent 30,000 h. p.

The Jones & Laughlin Steel Co., Pittsburg, has placed a contract with the Brown-Corliss Engine Co., Corliss, Wis., for a cross compound rolling mill engine. This is the third contract for engines placed by the Jones & Laughlin Steel Co. within the last two months.

BOILER MANUFACTURERS' ASSOCIATION.

The American Boiler Manufacturers' Association, of the United States and Canada, held its sixteenth annual convention at the Southern Hotel, St. Louis, Oct. 4, 5 and 6. The convention was called to order Tuesday morning by President John O'Brien, of St. Louis, and an address of welcome was delivered by Capt. Joseph Boyce, vice president of the city council of St. Louis, who represented Mayor Wells. Words of greeting were also spoken on behalf of the local committee by Chas. J. Wangler. Robert Munroe Jr., of Pittsburg, responded to the address of welcome, after which President O'Brien delivered his annual address. Business meetings were held Tuesday afternoon, Wednesday morning and afternoon and Thursday morning and afternoon. Numerous matters relating to the manufacture of boilers were informally discussed and considerable time was devoted to the labor question. The final action was not taken in regard to labor conditions, but resolutions were adopted tentatively to be finally considered at the next meeting after consultation with other manufacturers. The report of the committee on membership indicated an active membership of 95 with 29 associate members. It was decided to hold the next convention in Toronto. The following officers were elected: President, Robert Munroe Jr., Pittsburg; first vice president, M. F. Cole, Newman, Ga.; second vice president, Peter J. Hamler, Chicago; third vice president, John J. Main, Toronto; fourth vice president, J. Don Smith, Charleston, S. C.

The numerous entertainment features, which included many courtesies shown to the ladies, were thoroughly enjoyed by all and concluded with an elaborate banquet at the Southern Hotel Thursday night, which was attended by 200 ladies and gentlemen. The banquet hall was elaborately decorated with American Beauty roses, smilax, carnations and cosmos. Mr. James Lappan was toastmaster. The speakers were the following: H. J. Hartley, ex-president of the A. M. B. A., Cramp Shipbuilding Works, Philadelphia, "Shop Talk;" Robert Munroe Jr., president-elect of the association, Pittsburg, Pa., "The Greater A. M. B. A.;" George N. Riley, of the National Tube Works, St. Louis, who during his response on "The Southern Hotel" presented to the retiring president, John O'Brien, a gold-headed ebony cane suitably inscribed, Mr. O'Brien, expressing his thanks for the handsome gift; W. O. Duntley, president of the associate members' organization, who spoke on "Hot Air;" M. F. Cole, first vice president-elect, who delivered a happy speech on "The Sunny South;" John J. Main, Toronto, Can., who discussed "Reciprocity;" M. P. Bull, an attorney of Toronto, who endorsed all the promises which Mr. Main had made in regard to entertaining the convention in 1905; C. E. Downey, who responded to the toast, "The Ladies;" Chas. J. Wangler, St. Louis, who spoke on "The Fair," and instead of describing the exposition, paid his compliments to the ladies; and Miss Alice B. Chute, assistant manager of the Enterprise Boiler Works, at Youngstown, O., referred to as the only lady boiler manufacturer in the United States, who made an exceedingly happy response. Secretary J. D. Farasey, of Cleveland, responded to the toast "Entertainment." He was highly complimentary to St. Louis and to all who contributed to the entertainment features of the convention. Short talks were made by W. L. Hirsch, of Pittsburg, and P. J. Casey, of Chattanooga, and Mr. Lappan told his famous "Horse Story." Resolutions of thanks were tendered to the local committee and all who had contributed toward the success of the convention.

The members of the local committee were: E. A. Downey, chairman, National Tube Works Co.; John O'Brien, John O'Brien Boiler Works Co.; Jos. F. Wangler, Jos. F. Wangler Boiler & Sheet Iron Works Co.; F. Baskerfield, Crucible Steel Co. of America; J. B. Sharp, Worth Bros.; C. H. Huff, East St. Louis Locomotive Works; Chas. J. Wangler, Jos. F. Wangler Boiler & Sheet Iron Works Co.; H. C. Meinholtz, Heine Safety Boiler Co.; Jas. Sullivan, Ewald Iron Co.; J. F. Hager, Western Iron & Supply Co.; Jos. A. Wangler, Jos. F. Wangler Boiler & Sheet Iron Works Co.; A. S. McEldowney, Scully Iron & Steel Co.; T. G. Meier, Heine Safety Boiler Co.; A. Ruemmeli, Ruemmeli Dawley Mfg. Co.; E. R. Blagdon, National Tube Works Co.; Jas. J. Rohan, John Rohan & Sons Boiler Works Co.; Geo. Wallen, East St. Louis Locomotive Works; Frank Worcester, National Tube Works Co.; E. H. Boehnken, Crane Co.; C. A. Thompson, railway supplies; J. B. Corby, C. A. Thompson; F. Doyle, Western Iron & Supply Co.; E. R. Fish, secretary, Heine Safety Boiler Co.; T. P. Wallace, J. Dur and A. Kottsieper, Western Iron & Supply Co.; J. A. Prescott, Rand Drill Co.

PHILADELPHIA FOUNDRYMEN'S ASSOCIATION.

The October meeting of the Philadelphia Foundrymen's Association, held at the Manufacturers' Club, was the 140th meeting of this organization. It was devoted to a discussion of the proposal to form a foundry foremen's association. The outcome was a decision to form such an organization, and a meeting will be held on Wednesday evening, Oct. 19, at the Manufacturers' Club, to elect officers and adopt a constitution and by-laws. At the meeting of last week, A. T. Williams, foreman of the Enterprise Mfg. Co., Philadelphia, was chosen temporary chairman; W. P. Cunningham, foreman of the steel foundry of the American Bridge Co., Pencoyd, Pa., was made temporary secretary and treasurer. The following committee was appointed to draft a constitution and by-laws: James B. Strain, foreman Robert Wetherill & Co., Chester, Pa.; John P. Cunningham, American Bridge Co., Pencoyd, Pa.; George P. Benhert, foreman Williamson Bros. Co., Philadelphia. It is expected the new organization will start with about 20 members. The objects of the Associated Foundry Foremen, the organization which has been instrumental in starting the various local associations of foremen, are stated below, and the different classes of membership defined:

Objects.—1. The advancement of the practical end of the foundry and the up-to-date ways and means of running same. 2. A discussion of appropriate subjects and the publication of same. 3. Education of the foremen as to the best theory and practice of molding. 4. Reducing the cost of molding. 5. The society shall neither endorse nor recommend any product consumed in foundries. 6. No foundry foremen shall be asked to advance information which would be detrimental to his employer.

Membership.—Active members shall be those who have served as foundry foremen, foremen coremakers, superintendents of foundries, or their assistants. Honorary members shall be those who are intimately connected with the foundry trade or in position to render service of value to the society.

F. C. Everitt, of New York, secretary of the Associated Foundry Foremen, explained the objects and reviewed the work of that organization, indicating the ways in which it had been of benefit to its members and to the foundry industry. Many questions were asked by Philadelphia foundrymen and by the foremen present relative to the attitude and purposes of the Associated Foundry Foremen. During these preliminary proceedings, Thos. Devlin, president of the Philadelphia Foundrymen's Association, occupied the chair.

German Machine Tool Imports Increasing.

The association of German manufacturers of machine tools, in a recent report on the condition of the machine tool industry, complains that sharp competition in foreign markets makes it difficult to obtain orders or remunerative prices. The importation of American and English machine tools into Germany is notably increasing. During the first half of this year 1,100 metric tons of foreign machine tools entered Germany, against 450 tons in the same period of the preceding year. The association therefore demands higher tariff rates on imported machine tools, in order to check their importation and thus protect the interests of German manufacturers.

The Midland Iron Works, Racine, Wis., has been absorbed by the Stowell Mfg. & Foundry Co., South Milwaukee, Wis.

Three brothers, Chas. L., Louis E., and Wm. A. Bauer, have purchased an interest in the Foos Mfg. Co., Springfield, O., which will be reorganized at an early date.

A 300-TON TESTING MACHINE.

J. H. Wicksteed, director of the firm of J. Buckton & Co., Ltd., of Leeds, England, gave a brief description of a 300-ton testing machine before the August meeting of the British Association at Cambridge. The utility of such large testing machines is evident from the facts brought forth by investigators like Mr. Keep, in whose noteworthy paper at Chicago in June before the mechanical engineers, was discussed the difference in mixture between large and small castings of gray iron. Mr. Wicksteed was of decided opinion that in order to test cast iron efficiently it was desirable therefore to have a test bar as near the size of the subject as possible. The following extracts taken from the paper will show the remarkable capacity of the machine:

The direction in which the machine has carried testing further than any previous device is in its ability to test the strength of full-sized members of structures. It will test a strut 88 ft. long by 3 ft. 3 in. by 3 ft. 3 in., or a chain cable 13 fathoms long of 4½ in. diameter iron, and it will test a beam 3 ft. 3 in. broad, 6 ft. 8 in. deep, by 20 ft. between supports. It will also take hold of a rivet and pull it to destruction, or crush a bullet. It has also carried shearing tests further than hitherto. It will test in single shear a bar 8 in. wide by 2½ in. thick.

Machines of comparatively small dimensions suffice for testing specimens of the material of which struts, links, girders, and arches are made; but to test the struts, etc., themselves, which form bridge members, or members of any construction, the machine must be large and powerful; and to do this work economically the machine must be so designed that testing long or short pieces in any of the different senses can be accomplished without any change of appliances which involve labor and delay. The very reason for testing by machinery is to save time and labor and expense. Think what the expense would be to load a girder with 300 tons of dead weight. The weights themselves, and supports for the girder, would cost about £2,400 ($11,700). The loading and unloading of the weights would make each experiment cost a hundred times as much as if it were made on the machine now described.

A testing machine measures the load, which is applied to a specimen, instead of actually loading the specimen with dead weights; and in proportion as the loads are large, the saving between direct loading and measuring the load by a machine becomes large also.

The most primitive form of machine has the specimen anchored to a foundation at one end, and pulled at the other end by the short end of a lever, with scale pan for weights at its long end; but there is as much difference in convenience and economy between such a machine and the most highly developed form of machine as there was between the use of a lever and the simple use of direct loads. The next step in the development of testing machines was to apply tractive force to the end of the specimen, which had previously been anchored, and measure this tractive force by a lever and scale pan as before. The earliest machines of this kind were made after the introduction of chain cables for ships, which took place in 1813; and when these had become largely adopted in place of hemp cables by the admiralty, a machine was made for the Royal Woolwich Dockyard, by Bramah, of Pimlico. The machine had an hydraulic cylinder at one end, to put the pull on to the chain, and levers with small weights at the other end, to measure the amount of the pull. It was on this machine that Professor Barlow made his experiments on the strength of materials, but neither the machine of 1813 nor the machine of 1832 was adapted for testing struts; and for anything else but chains they must have been extremely inconvenient. The introduction of steel for ship building in 1875 led to a very large amount of testing plate strips in machines of about 50 tons power. These machines have been made so convenient for the special purpose that a specimen of steel plate can be accurately tested for strength and extension every minute; in other words, sixty tests an hour is not unusually quick. But imagine loading 50 tons of dead weight on to a scale-pan in order to test a plate strip. The labor and expense of making very few such tests would obviously pay for the whole cost of a machine. Side by side with this large expansion in testing specimens of material, which was caused by the introduction of steel for ship building and for boilers, there has been a slower expansion in the direction of testing actual structures. As has been said, the machine of 1813 was for testing actual chain cables. Later a demand arose for testing other structures, such as struts, and in the same year that marked the increase of testing of plate strips, the importance of putting down more machines for testing structures was taken up in the United States of America, where their methods of constructing bridge girders particularly demanded testing the actual tension and compression members; this led to the United States Government putting down the celebrated machine at Watertown arsenal. The machines for testing both in tension and compression to any large scale have all been made within the last half century, and in all these machines an attempt has been made to utilize them not only for full size members of structures, but also for large and small specimens of material. The arrangement of a machine for measuring either in compression or tension, and, at the same time, for lending itself conveniently to deal with long or short pieces, is not easy of accomplishment, and has been attempted with varying success.

The development of these universal machines may be traced as follows: In 1852 Ludwig Werder, of Nuremberg, made a machine adapted for both tension and compression. In 1866 David Kirkaldy opened his laboratory, in which was a machine which would test both in tension, compression, and deflection. In this machine he could test a cast iron column, 21 ft. 6 in. long by 2 ft. 8 in., to destruction with a load of 270 tons. In 1879 a machine, built by A. H. Emery, was started at Watertown arsenal, U. S. A., which would test in all the senses of Kirkaldy's, to about the same loads, and which would take in columns 30 ft. long by 2 ft. 6 in. by 2 ft. 6 in. The nominal power of this machine is 357 imperial tons. At Charlottenburg, a machine was put down in 1894 to test up to 492 imperial tons, and to take in columns 49 ft. long by 2 ft. 7 in. by 2 ft. 7 in.

In what follows it must be understood that the expression "straining" means the force which tends to elongate, compress, or otherwise deform the test-piece, and the expression "balancing" means measuring the straining force to indicate its equivalent in deadweight. In review of these machines it may be said that in the Werder machine the balancing-levers are carried on an hydraulic ram, and pull the straining-crosshead with them. The rest of the machine consists of an inert bed, extending in the opposite direction to the ram, and on this bed short lengths of cast iron pieces are placed so as to vary the distance of a stationary crosshead to suit long or short tension-pieces. For compression the crosshead carried by the balance is altered in distance by links to compress longer or shorter pieces between itself and the butt end of the hydraulic cylinder.

In the Kirkaldy machine the hydraulic cylinder is in the same position as Werder's, with the ram working outwards from the end of the bed, but the balancing-levers are at the other end of the inert bed. The ram pulls the straining-crosshead through four screws, and the crossheads can therefore be adjusted to any required distance from the balancing-crosshead. For compression tests a set of eye-bars are required to carry a compression platen from the balancing-crosshead to the side of the straining crosshead, which is next to the hydraulic cylinder.

In the Emery machine the difficulty of adding or removing parts to change the machine between tension and compression is got rid of by having the hydraulic cylinder double-acting, so that it will either push or pull on to the balance, and by making the balance so that it can either be pulled against a chamber, containing fluid, which delivers the pull to the scale-beams, or the chamber can be pushed against the balance, when it equally delivers the pressure to the scale-beams. The difficulty of coupling the machine to long or short pieces is dealt with by moving the hydraulic cylinder, with its double-acting piston and straining-head complete, to the desired distance away from the balance.

In the Hoppe machine at Charlottenburg, instead of having a double-acting piston, as in the Emery machine, the hydraulic cylinder can be locked to the bed so that the ram goes forward, or the ram can be locked to the bed so that the cylinder goes backward. The straining-cylinder will, there-

fore, either exert a push or a pull, and the balance is made so that it will deliver either a push or a pull to the weighing-levers by arranging for a push to act upon the short arms of two elbow-levers, and the pull to act upon the elbows of the levers, while the short arm forms the fulcrum. In other words, the elbow-levers, when balancing tension, act as levers of the second order, and, when balancing compression, as levers of the first order.

The difficulty of coupling to long or short pieces is dealt with, as in the Emery machine, by traversing the hydraulic cylinder upon the bed nearer or further from the weigh-bridge. The author has succeeded in making a machine which requires no parts to be added, or removed, to prepare it for its function of testing in compression or in tension, nor to prepare it for taking long or short pieces, and this is accomplished with a single-acting ram, and with a balance always pressing in the same direction upon the short end of a lever of the first order.

In 1904 the French Government opened, at the Conservatoire Nationale des Arts et Métiers, the machine to be described, which will test up to loads of 300 tons in compression, tension, deflection, and shearing. It will take in columns 88 ft. long by 3 ft. 3 in. by 3 ft. 3 in., and tension members of the same length and diameter. This machine was made by the author's firm—Messrs. Buckton & Co., of Leeds.

The frame or bed, instead of being fixed, as in ordinary machines, is movable; secondly, the weighing-levers, contrary to the general arrangement of machines with fixed beds, are at the same end as the straining-cylinder, and they are mounted on this stationary-cylinder instead of being carried on the moving ram, as in the Werder machine. It is this combination which gives the machine the facility which it possesses for testing a great variety of sizes, and for testing either in compression or tension, without rearranging the machine. The beauty in the design of this machine, which gives it its great convenience, is that the hydraulic ram moves a long frame which is the whole length of the longest specimen. This straining-frame is both surrounded and traversed by a balancing-frame; the result is that the straining crosshead can push on to one part of the balancing frame and pull on to another part, and the straining crosshead can itself be run along the straining-frame into a position for pulling or pushing either long or short pieces. One of the compression platens also has a spherical seat, so that it can be adjusted to suit the end of a column which is not quite parallel on the two ends.

During some shearing experiments on bars rising by ½ in. in thickness from ½ in. to 2½ in. it was noticeable that the 2½-in. thick bar did not take five times the load, nor the 2-in. thick bar four times the load that was required to shear the ½-in. thick bar.

A very complete article on this machine has been given by M. Breuil in *Le Génie Civil*, and in this article he says: "It is more and more necessary to differentiate between the testing of parts themselves and testing specimens of the material of which the parts are made. Machines of small power which suffice for the latter are of no value for the former purpose." Speaking of the water-tightness of the hydraulic ram, he says: "This we have verified by putting a tension of 32 tons upon a bar of steel one evening, and finding the next morning that it still had a tension of 30 tons. The leaks past the piston were, therefore, imperceptible, and the machine can, without difficulty, be used for delicate measures of elasticity." Alluding to the movable straining-head, he says: "Thus to pass from one kind of test to another there is no need, as in ordinary machines, to employ long coupling-rods, which, with a machine of this size, would be extremely cumbersome; it suffices merely to run the moving crosshead to the required position, which, as it is mounted on wheels, can be easily done by a single man. Locking the moving crosshead to the sliding-bed is very quickly done; it requires only about a minute. All the motions of the sliding-bed, as well as the adjustment of the poise weight on the steelyard, are controlled without difficulty by a single operator on the platform—an economy of labor which is worthy of remark." Alluding to the diagram apparatus, he says: "The interest attaching to the preservation of an autographic record of tests is at the present time becoming more and more appreciated. We have not failed to conform to this requirement, and whatever may be the kind of test carried out, the machine is capable of tracing the complete diagram. The loads are recorded upon a large drum by a vertical displacement of a pen by means of a wire, which moves at the same time as the traveling poise-weight, and an amount proportional to the displacement of this latter. By means of a train of change-wheels, actuated by the hand-wheel controlling the traverse of the poise-weight, the motion of the pen can be regulated at will to give a scale of ordinates of 10 millimetres, 5 millimetres, 2 millimetres, or 1 millimetre per ton. The deformation of the test-piece is transmitted as abscissæ to the recording-drum, being transmitted by suitable wires passing over pulleys which turn the drum in such a manner as to record the deformation either full size or multiplied five or ten times." In regard to the accuracy of the machine, he says: "The superiority of this machine, which may have rivals in mere power, consists more particularly, we believe, in its accuracy, its sensibility, and its convenience of operation. The determination of its accuracy has been made repeatedly by means of calibrated copper crushers which were crushed in the most delicate machines of the laboratory, which had been carefully checked by dead-weights for the purpose; the results showed themselves uniformly concordant. These experiments were not, it is true, carried out with very heavy loads; but when a machine is inaccurate, it is so even at small loads; but in our case no inaccuracy was found. A further test of sensibility was made by applying a load of 100 tons to a long chain with the steelyard in equilibrium, and half-way between the limits of its range, and then moving the poise-weight a fraction of its travel corresponding to 4 lb. upon the steelyard; this amount, plus or minus, upset the equilibrium. The testing laboratory therefore," he says, "possesses a powerful machine, whose handiness, precision, and sensibility merit every confidence."

At the ceremonial inauguration of the machine on June 16 last a bar of hard steel was broken in tension, 4 in. by 1½ in. in section, with a load of 228 tons, and immediately afterwards a large slab of armored concrete, 32 in. broad, 12 in. thick, was broken in deflection between supports 16 ft. 6 in. apart.

Mr. Wicksteed has since sent to *Engineering* the following letter:

"In the short paper which I presented at the British Association meeting I pointed out that it has only been in machines of the last half century that compression testing has been seriously provided for. I doubt, however, whether anything like a perfect compression test of a long strut or column was made till within the last quarter of a century. It is not difficult to arrange an apparatus for giving the true crushing strength of a solid cube or of a short solid cylinder of about two diameters in length, or of a tube of several diameters in length; but when you deal with a piece of thirty or forty diameters in length, efficient means must be taken to prevent the ends wandering in the least degree from the line of thrust. It is comparatively easy to guide the straining platen so as to prevent it wandering, but the balancing platen was not, to my knowledge, thoroughly well guided until Professor Kennedy designed a roller-stay for his machine at the London University College. When the writer made a subsequent machine for Professor Kennedy, he became acquainted with this roller-stay, and has carried it out on a large scale in the 300-ton Paris testing machine. In that machine the tension rods, which deliver the pressure on the balancing platen to the levers, are themselves 120 ft. long; and if the balancing platen were floating unrestrained, it might wander in such a way as to allow a serious bending moment upon the long strut or column being tested. The arrangement of the roller-stay, which prevents this, is as follows: The balancing crosshead is surrounded by a frame attached to the fixed bed plate; parallel roller paths on both horizontal and vertical planes prevent the balancing crosshead from swerving in any direction without straining the frame through the rollers. The roller paths on the frames have inclined seats. At the beginning of a compression test these roller paths are set up so that all the rollers are free from play, then a small load is imposed upon the strut being tested. This small load will suffice to show a tendency of the strut to wander out of line; and, on feeling all the rollers, those on two sides of the crosshead will

be found to have been tightened between their paths, and those on the other side to have been eased.

"The right course to adopt is, then, to set up the tight roller paths on their inclined seats until the crosshead is pushed back against the rollers on the other two sides, which insures that it has been restored to its original alignment, whereupon the test may proceed with the certainty that the test thrust is acting straight along the axis of the specimen. The frame is no longer in a state of ease, the spring has been taken out of it, and it forms a rigid guide.

"It is possible by this perfect system of guilding to compress a solid cylinder of several diameters in length into a symmetrical barrel shape, and to bring an astonishing load on to a cast iron bar 1 square inch section and 36 in. long. If Professor Kennedy had time to look up the records of some of his experiments, he could probably give some very instructive comparisons between the results of compression tests on struts made with a semi-free balancing platen, and similar tests made on one guided and adjusted as described, where the position of the opposing platens is prevented from allowing the axis of the specimen from getting out of line with the axis of the thrust by more, at any rate, than the hundredth part of an inch. I write this letter as a supplement to the paper, because I feel that, in recording the most prominent stages in the development of the testing machine, the roller-stay of Professor Kennedy should rank as one of those stages."

American Shipbuilding Co.

At the annual meeting of the American Shipbuilding Co., held in Jersey City, last week, James C. Wallace, of Cleveland, was elected president to succeed W. L. Brown. Robert Logan, of Cleveland, succeeds Mr. Wallace as general manager. R. C. Wetmore was elected a director in place of L. C. Hanna, who retired. President Brown sent in his annual report. The company now has eight steamers under contract for fall and winter work and good prospects for several more. The financial statement for the year ending June 30 shows a large decrease in the earnings, as was expected, but there are some very favorable features. During the year the mortgage of $150,000 on the Buffalo yards matured. This debt was paid, and, as it was the only encumbrance on the company's property, there is now no debt. The company has not a bond outstanding. The undivided profits for the year ending June 30 were $187,127.32. The company paid but one dividend on the common stock during the year, it being one percent quarterly, amounting to $76,000. During the year $209,000 was set aside for maintenance and depreciation and $78,000 for rebuilding drydocks and other repairs. A comparison of the statement of earnings just issued with three preceding years shows as follows:

Net earnings, 1904, $1,028,175; 1903, $2,212,841; 1902, $2,507,551; 1901, $1,998,542.

Depreciation and maintenance, 1904, $288,047; 1903, $791,086; 1902, $770,293; 1901, $271,905.

Surplus after deducting maintenance and depreciation charges and preferred dividends, 1904, $187,128; 1903, $868,755; 1902, $1,184,258; 1901, $1,173,637.

Surplus after common dividends, 1904, $111,128; 1903, $640,755; 1902, $1,184,258; 1901, $1,173,637.

Accumulated surplus, 1904, $3,678,443; 1903, $3,567,316; 1902, $2,926,561; 1901, $1,742,303.

Two steamers are loading steel rails for Korea, for use in the Japanese military line between Seoul and Wiju. Contracts have also been let recently for the shipment of fully $2,000,000 worth of machine tools to Japan. The orders were principally allotted to the Niles-Bement-Pond Co., Manning, Maxwell & Moore, the Prentiss Tool & Supply Co., Lodge & Shipley, of Cincinnati, O., and the Brown & Sharp Co., Providence, R. I. The machinery will be shipped through Mitsui & Co., Takata & Co. and Okura & Co., of New York City.

The Contractors' Supply Co., Pottstown, Pa., has recently been organized and has leased the auxiliary casting house of the Warwick Iron & Steel Co. The old casting house is being fitted up as a foundry for doing a general line of castings for contractors, railroad work, etc. Preparations are being made to do at least a portion of the casting with metal direct from the blast furnace.

AMERICAN STEEL FOUNDRIES' REPORT.

The American Steel Foundries shows the effect of unfavorable trade conditions that have prevailed within the period covered by the fiscal year of the concern, which ended July 31 last. Net earnings fell off $1,390,072, the total rising to only the small sum of $803,607, against $2,193,679 in 1903. A reduction in renewals and in administration and other expenses and a small increase in other income brought the decrease in the surplus after interest on bonds down to $1,202,923. This surplus was only $330,480, and preferred dividends amounted to $697,500, which left a deficit for the year of $367,020. This deficit was met out of the previous surplus of $768,039.

The president, in his address to the stockholders, stated that the company had suffered by the reduced commercial activity of the past year, in common with all other industrial enterprises, to such an extent that the gross sales for the year ended July 31 were 46 percent less than the preceding year. He stated that the company's plants have been improved and the monthly capacity materially increased. The company is now prepared to turn out a large tonnage as soon as the industrial conditions have improved. Numerous economies have been effected in expenses of administration of upwards of $100,000 a year. The company has acquired 30 acres of land and put in a new plant at Indiana Harbor, Ind. This plant was made necessary to meet the imperative needs of greater output. The real estate in Chicago has been sold. The new plant will have about twice the capacity of the former plant and can be operated with greater economy.

The directors of the American Steel Foundries met Oct. 6 and at their adjournment it was stated that no action had been taken on the question of dividends on the preferred stock. As that meeting was one at which the dividends would have been declared in regular course, the failure of the board to act is equivalent to passing the dividend. Directors said that the question had not been brought up at all, from which it is inferred that the directors had by tacit agreement as individuals decided to cease paying dividends for the time being.

At a meeting of the board of directors the following officers were elected: Charles Miller, president and chairman of the board; Geo. B. Leighton, first vice president; W. D. Sargent, second vice president; F. E. Patterson, treasurer and secretary; Max Pam, general counsel. All of those elected have previously held the same offices except Mr. Sargent, formerly president of the American Brake Shoe & Foundry Co., who is elected second vice president in charge of manufacturing. An executive committee was also elected, consisting of Geo. B. Leighton, Edward F. Goltra, W. D. Sargent, E. B. Thomas, Max Pam and Charles Miller.

The Cherry Valley Iron Co., Pittsburg, will shortly complete the rebuilding of its furnace at Leetonia, O., and expects to blow it in about Nov. 1. The new stack is 80 x 18 ft., as compared with 75 x 17 ft., the size of the one torn down. With the completion of the work this company will have practically a new plant. Last year three Massicks & Crooke stoves were built to take the place of the old stoves which did not have sufficient capacity. The stoves are 85 x 21 ft. In addition 100 coke ovens have been built, making a battery of 200 ovens at the furnace, giving a sufficiently large output to provide all the coke required.

The proposed meeting of the supply and machinery dealers in the North, East and West which was to have been held in Cleveland, Oct. 18 and 19, has been postponed. The meeting will be held in Cleveland and due notice of the time and place will be given. It is announced by C. B. Carter, secretary of the Southern Supply & Machinery Dealers' Association, who has conducted the correspondence referring to the proposed Northern association, that some of the preliminaries had not been fully arranged in time to carry out the original plan for the meeting, but that the success of the movement is considered assured.

The Oesterlein Machine Co., of Cincinnati, is the maker of the universal tool and cutter grinder described in *The Iron Trade Review* of Oct. 6.

NOTES ON AMERICAN STEEL WORKS.

We make a further extract below from the series of articles in London *Engineering* by David E. Roberts, of Cardiff, Wales, on his observations in American steel plants and rolling mills:

Rolling Mills.

The mills are full of labor-saving appliances, many of them most ingenious. Such means are necessary for two reasons—the rate of wages is excessive, and continuous hard manual labor is practically impossible in the hot summer months. At and about the rolls men are seldom seen. Great importance is attached to regularity of working. The mills are going almost every minute. Careful note is taken of all stoppages. Shortage of steel and of steam are practically unknown, and there is not the usual few seconds' stoppage between the finishing of one bar and the beginning of the next; the rolling is continuous. The engine attendant is provided with a helper, who handles the levers for him while he himself devotes his time to thorough examinations, adjustments, lubrication, etc., and there is no doubt that this system of supervision reduces largely the number of stoppages for repairs, breakdowns, etc.

Standardizing of sections is found to be of the greatest service to the manufacturers in the States, and saves them considerable expense. There is, on the whole, more massive designing of detail about all their mill plant; bearings are extra large, well covered and lubricated, and shafts are heavy. Live rollers are frequently seen made of solid forgings, with the spindles hammered out. Straight and staggered teeth on mill pinions are in some cases now superseding the helical form, and with good reason, the latter being much overrated. Steam pressures are usually high—130 lb. to 150 lb.—and condensing (jet type) is pretty universal. The speed of rolling is about 60 to 80 percent higher than our own. We saw nothing exceptional about the workmen there, and quite fail to agree with the statement that has so often been made—that they are a better set of men than ours.

Great attention is given to the heating; there are any number of soaking-pits, and the steel goes into them very hot, and comes out in splendid condition. We never saw a hard bar go into the cogging-mill; and, indeed, the immense reduction done in the first few passes would be impossible except under the most perfect heating conditions. All furnaces are gas-fired (regenerative); sometimes natural gas is used, but usually the gas is got from producers. The furnaces are generally large, and hold about thirty ingots each—four to a hole. The brick-lined doors are carried on four wheels, and are moved by an hydraulic cylinder. These furnaces have several advantages; they are very clean, the heating is very even, and there is a small labor cost. It is claimed, too, that there is less waste of steel than in the ordinary coal-fired type of furnace. Appearances, however, rather make us somewhat doubtful as to the accuracy of this claim. The slag is tapped generally through the bottom of the furnace. A hole under the middle of each door is covered with a common red brick shaped like a couple of dinner-plates put face to face. When slag is to be tapped, a bar is dropped upon this brick to break it, and, after the flow, the brick is replaced by a fresh one.

All rolls used at Homestead, except the finishing, have 3 percent of nickel in them. Carborundum is also added. A good type of roll-lathe was seen at Homestead. They have a way of ragging certain roughing-rolls there in position. The top roll is lifted slightly, and a pair of toothed edge rollers connected by a pair of links is thrown under it. The roll is then put down again and set turning. The blades for hot shears are not usually forged out of special steel, but are cast by the dozen in the steel foundry. In the Homestead mills the bearings for all pinions, rolls, etc., have steel bodies, with a part brass and part babbitt lining.

Plate Mills.—There are four plate mills at Homestead: 128-in. and 119-in. ordinary and 48-in. and 42-in. universal. The mills are of massive construction, and run at high speeds. Slabs are heated in horizontal gas-fired furnaces, and are charged and drawn mechanically. The heating accommodation is ample, there being usually six four-doored furnaces per mill. The finished plates have a fairly good surface; brushwood is not used for clean rolling, coarse-grained salt being found more effective, and is used on all plates except those containing nickel, upon which latter finely-ground small coal is used. Plates are not stocked at all before they are sheared; the shears are a long way from the mill, at the end of a slow-moving roller gear, and every plate is marked off, stamped, etc., on the way to the shears, and is cut up as it arrives. Plates are marked to template, and not to square and measure; and to avoid error as much as possible orders are sent in to the mill in inch dimensions, as 48 in. by 360 in. by ¼ in. Plates are not usually turned up for inspection. The 128-in. mill is three-high, the top and bottom rolls are 34 in. in diameter, and the middle roll 20 in. The top and bottom only are coupled direct to engine, and they run up to nearly 80 revolutions per minute. This mill has made 1210 tons (1249 tons gross) of plates 65 in. by 200 in. by ⅝ in. in 24 hours. The mill has three shears, so that plates can be sheared on all sides with as little handling as possible. The floor space between the shears is filled up with the usual castor rollers. Ample overhead crane accommodation is provided, and there is every facility for getting plates cleared away.

The cooling banks of the universal mills are worth noting. The plate upon leaving the rolls may pass through a straightening machine consisting of a number of small horizontal rollers which remove buckles and short bends, should there be any. The straightener is embodied in a strong box frame carried on four wheels, and it may be moved laterally into or out of working position as desired. In the case of the 48-in. mill the live-roller gear which receives the plate is about 100 yards long, with rollers 18 in. in diameter and 3-ft. centers. This roller-table runs down the center of a long shed, and has on either side of it an arrangement for straightening the plate edgewise, a cooling-bank and a live-roller bench leading to the shears. The two sides of the shed are in duplicate, and in practice plates are skidded to either side alternately. The skidding is done by chain-racks, about 6 ft. apart, that slide in cast-steel troughs, which can be raised and lowered at will. When a plate comes to rest upon the roller-table, all the troughs rise simultaneously, the chain-racks are set in motion and the plate is carried away over bevel gear, etc., and dropped into the jaws of the apparatus for straightening it edgeways. When the straightening is done, the plate is again raised and moved forward and placed behind the other plates on the cooling-bank, and by degrees it gets to the roller-gear and finally to the shears.

The bank is ingeniously arranged and is very effective. The edge-straightener consists of a number of heavy cast-iron tables reaching the whole length of the cooling-bank. Each plate has a heavy flange or jaw along its top face, and all these flanges are fixed in a perfectly straight position. Each table has also sliding upon it a rack with a heavy jaw. All the jaws are capable of simultaneous movement and can grip the plate edgewise, just as so many parallel vises would do, and thus try to straighten it. It is doubtful, however, if this latter arrangement is thoroughly satisfactory. In addition to the cutting-off shears another is provided for slitting.

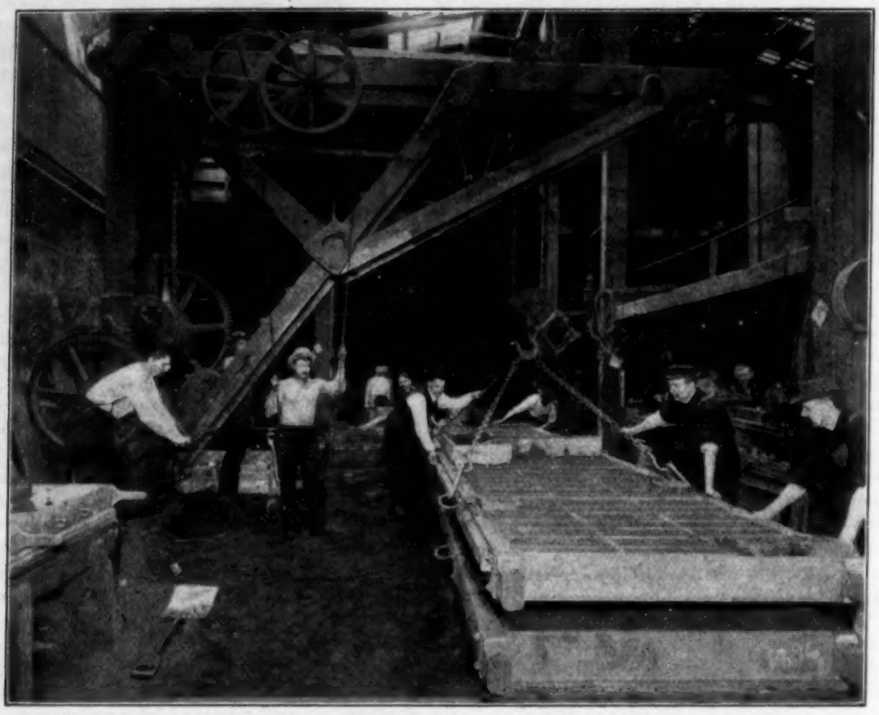
Three electric traveling-cranes, 100-ft. span, control the whole length of the building, and do all the loading up, repairs, etc. The traveling-carriages overhang the crane-girders, and the winding is done from the extremities of the latter by two chains. Better bridling effect and balance is thus obtained when handling long plates, also a little less swing. The plates are carried upon hooks; magnets have been tried in several of the American plate-mills, but are not satisfactory—somewhat unsafe. The cranes carry their own lights about with them in the form of glow-lamp nests that are arranged in a row along the center of the girder. The 48-in. universal mill has rolls 30 in. in diameter, reduces direct from the ingot, and turns out 14,500 to 15,000 tons of plates a month. The usual plate-test is about 25 tons tensile, 30 percent elongation, and 45 percent contraction.

Material is prepared for ordinary plate-mills in two slabbing-mills (universal), 30-in. and 32-in. Both mills are provided with two shears, one placed a long way ahead of the other, the one next to the rolls being hydraulic, and being used for heavy material, the other shears being steam, and dealing with thinner slabs. The universal type of slabbing-mill is more common in the States than at home; it saves great waste of time in not having to lift the top roll, and saves the trouble of edging the slab. Reduction also goes on in both directions simultaneously. In most slabbing-mills the vertical rolls are driven by a separate engine; in the universal plate mills both the vertical and horizontal are driven usually by the same engine.

WILLIAMSBURG BRIDGE TABLETS.

The Williamsburg bridge is not only the largest suspension bridge in the world, but to the foundryman it has furnished a very interesting example of bronze casting work. There is a large name plate or inscription plate extending across each end of the bridge, upon which are recorded the important facts concerning its construction.

These tablets have a total length of 52 feet 7 inches, and a width of 4 feet 3 inches, and they weigh 3 tons apiece. Each tablet was cast in three sections, the center section being 22 feet long, one of the side sections 16 and the other 14. These castings are extremely interesting, on account of the fact that we know of no other case in which plates of such a large area and comparative thinness have been successfully cast in one piece. The work was done by the Wm. H. Jackson Co. at their New York foundry, 229 to 239 West 28th street and we are indebted to S. W. Barr for the details as to the method of carrying out the work. The total thickness of each tablet was only 3/16 of an inch and hence it was quite a problem to make a wooden pattern that could be readily handled without warping. Special kiln-dried lumber was employed and the letters forming the inscription were fashioned separately and glued in place. The extent of the surface was such that each pattern was made in three sections.



MOLD FOR ONE OF THE TABLETS.

The molding and mixing of the great quantity of metal required in the casting was no easy matter. The copper was melted in the cupola and the other ingredients of the alloy in crucibles in the usual crucible furnace. They were then mixed in the proper proportions and cast into ingots. These

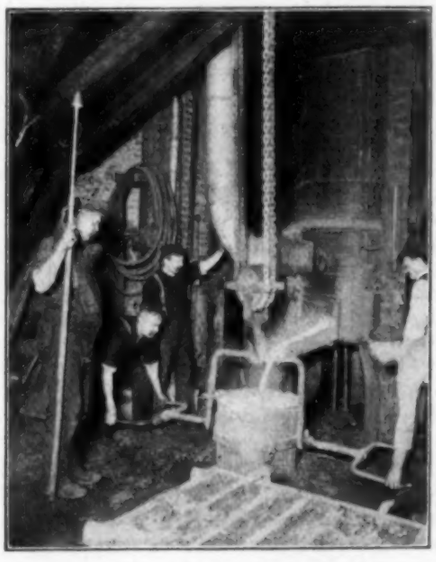
CLEANING AND FINISHING THE TABLETS.

bronze ingots were made before the date for pouring the large casting, and when the time for pouring the casting arrived, the bronze ingots were melted in an ordinary cupola such as is used in iron foundries. In this way the bronze was melted in one large charge so that there would be little or no loss or change in composition, and a very fluid metal resulted.

In making the mold the pattern was placed on a large molding board, rammed up in the usual way and the drag rolled over. The cope was then rammed up, lifted off, the pattern drawn, and the mold skin dried by using large wire baskets containing charcoal, which were suspended from a crane over the surface of the mold. For gating the casting a runner was cut around the pattern at a distance of a few inches and a large number of small gates cut from this for running the casting. The mold was poured simultaneously from seven points so as to fill it very quickly indeed. The pouring only occupied about eight seconds and it was only necessary to wait a few minutes until the cope could be removed. The 1,200 lb. of metal were poured into the mold from a ladle carried by the crane and the remainder from hand ladles.

The accompanying illustrations show the closing of the mold, the filling of one of the ladles at the cupola, the cleaning of the casting, and a view of the casting after it has been cleaned.

ONE OF THE COMPLETED TABLETS.



TAPPING THE METAL FOR TABLETS.

Work was resumed Oct. 6 in the shops of the Union Malleable Iron Co. and the Moline Scale Co., Moline, Ill. Four hundred men returned to work after having been idle since Sept. 25, when a storm damaged the plants to such an extent that they could not operate until repairs were made.

THE ADIRONDACK ORE RANGE.

We have the following from a New York State correspondent:

There has been so much in print in the past few years in regard to the iron ore ranges of Lake Superior, and also in regard to the iron ore bodies of the South, that people have apparently forgotten one of the oldest iron ore producing regions in America, and are probably not aware that near Port Henry, N. Y., there are iron ore mines which have produced continuously for the past fifty years. It may not be realized that their aggregate output is about 14,000,000 tons of iron ore, and at the present time they are equipped to produce about 700,000 tons per year of a high grade magnetic ore; also that at Lyon Mountain, in Clinton county, the Chateaugay Co. has been producing a special low-phosphorus ore which is probably as chemically pure as any known ore of iron, and at the present time could produce about 300,000 tons per year. There are also numerous other undeveloped properties; so that while practically this region is one of the oldest in the production of iron ore, there is also more undeveloped and unprospected territory than in any other like region, unless it be in the very far West.

This region has passed through many vicissitudes of the iron business and the changes in methods of manufacturing and handling, not only of the ores but of the finished product, have many times practically closed the business of the region on account of their not being able to meet the commercial conditions, owing to the distance from fuel and the long haulage at high freights to points where the ore could be utilized. The first use that the iron ores of this region were put to was in the manufacturing of iron by the old Catalan charcoal forge. The quality of the blooms produced by this method has probably never been excelled, and while an unlimited amount of very high grade iron ore was available at a reasonable price, which seemed to be perfectly adapted for this old, old method of manufacturing wrought iron, the question of the cost of fuel soon made the cost of these blooms excessive in comparison with the more modern methods of manufacturing high grade steel blooms or billets.

The rocky hillsides of the Adirondacks are only sparsely timbered and the available wood for the making of the necessary charcoal, within the reach of the forges, was soon exhausted. The same results occurred with the blast furnaces using charcoal as fuel, as it was found too expensive to collect within a reasonable distance the necessary wood for the manufacture of sufficient charcoal owing to the rough and hilly condition of the territory and also to the fact that spruce, pine and hemlock timber was too valuable for other purposes to be used for the manufacturing of charcoal. Thus today there is only one charcoal furnace left in the region.

In regard to the quality of the ore from this region: It is a pure magnetic oxide of iron and is found in the gneiss rock in lenticular lenses or chimneys, varying of course in size and shape, while in the manufacture of certain grades of iron every furnaceman is fully aware that magnetic oxide of iron for some reason is harder to reduce, or, in other words, takes a larger percentage of fuel than first-class red or brown

hematites like the Spanish Rubio or the Chapin ore of the Lake Superior, and is probably not designed by nature to be used alone in the making of high grade foundry iron. These ores are certainly not more difficult to smelt than a large number of ores that are used, not only from the Lake Superior region but from other regions also. The fact that the percentage of iron in the ores from this region can be kept above 65 percent and that they are free from moisture, counterbalances to a great extent the excess of fuel that is required to smelt the magnetic oxide; and a far better foundry iron can be made with a percentage of magnetic oxide in combination with brown or red hematites than with any other known mixture of ore when the iron is subjected to physical test as regards strength and fluidity. The reputation of the United States in manufacturing cast iron stoves made up of ornamental thin plates, which could not be duplicated in any other country, was built up on the foundry irons manufactured in the Lehigh Valley from a mixture of ore one-half magnetic oxide and one-half brown hematite.

Whenever any new ore has been placed on the market in large quantities to be used in a somewhat different method or process than had ever before been practiced, the verdict of the blast furnaceman has been that he could use only a small percentage of the ore on account of some difficulty, either retarding the output of the furnace or increasing his fuel consumption. This claim was put forth with a great deal of emphasis when the hard ores from the Vermillion district were first placed on the market, and every one connected with the iron business remembers the amount of literature which was printed at the time the Mesabi ores were first introduced, to show it was absolutely impossible to use more than a small percentage in any mixture of this ore without both decreasing the output and increasing the fuel consumption, but also running the risk of destroying the blast furnace by explosions, besides the immense loss which would occur by the blowing over of the fine ore. These difficulties in regard to the Mesabi have all been met, discounted and filed away as back numbers; and the relative prices of ores like the Chapin (which is used as an example of the first-class Lake Superior soft hematites), and the average Mesabis, as they are quoted on the market today, probably discount the commercial difference in value of the ore. The same process and the same inexorable law will settle the relative value of magnetic oxide of iron for this region, that settled the value of Mesabi. Nothing that I might say or any figures I might produce at present will affect the inexorable law. Although these ores have been used for so many years for the manufacture of irons for various purposes, I do not think that up to the present time the quality of the iron for which these ores were designated by natural law has had any large market. My experience in handling these ores, both at the mines and furnace, leads me to believe that for the manufacture of an open-grain low-silicon pig iron for basic open-hearth steel, that manufactured from the Adirondack ores will be found to have no superior; and furthermore, I believe that with a properly constructed furnace with sufficient power and modern appliances, backed up with the same amount of energy and genius that produced the gigantic blast furnaces at Duquesne, it will yet be possible to manufacture from these ores an iron suitable for basic open-hearth steel with as low fuel consumption per ton of iron and with as large an output for the furnace as has yet been done with the average Lake Superior ore.

While there are large quantities of ore that are suitable for not only regular Bessemer but also special Bessemer, I am strongly of the opinion that the great mass of the ore of this region will in the future be used for the manufacture of pig iron for basic open-hearth steel. A great many people have the mistaken notion that the Adirondack ores which are in large quantities are titaniferous. Any one at all familiar with this region knows that this is an entire misconception of the facts. Those who have had anything to do with the ores of this region know that the titaniferous ores are not found in the same rocks as the ores to which reference is made above. There are such large bodies of practically non-titaniferous ores that the question whether the titaniferous ore of iron is valuable or not, is one that is so far in the distance that it is not worth the time to discuss it. Of all the many Catalan forges and charcoal blast furnaces there was to my knowledge only one ever built that even tried to use titaniferous ore. This one was so far back in the mountains from a line of transportation that it would have been a commercial failure under any conditions; and as the records of what they did have all been destroyed and lost, there is no one today that can say positively whether they failed on account of the titanium in the ore which they tried to use, or whether the failure was caused by their location.

There has been really no well defined and systematic prospecting of this region ever carried on. The only thing we can judge is this, that the large mines which are now in operation, producing ore at a cost equal to any of the hard ore mines of the Lake Superior, where they have similar large bodies of ore, originally had at the surface neither outcrop nor magnetic attractions greater than hundreds of places that have never been disturbed by the hand of man. Whether these surface indications and outcrops will develop into large producing iron ore mines is a question for the future to decide.

Republic Iron & Steel Co.'s Bond Issue.

President J. B. Forgan, of the First National Bank, Chicago, has issued the following statement: "The Republic Iron & Steel Co. has completed its financial arrangements, which have been under negotiation for some time through the First National Bank and First Trust & Savings Bank. The company will issue $10,000,000 first mortgage bonds, protected by sinking fund, which will form collateral security for a loan of $7,000,000 on its two and three-year notes. The bonds will be deposited for the benefit of those who purchase these notes with First Trust & Savings Bank, which institution will also be trustee under mortgage. A sufficient amount of these two and three-year notes has already been sold to take care of the company's floating indebtedness and provide for all its present requirements. The balance will be placed when and as the company requires money. There will be no public subscription. It has not yet been determined whether the bonds will ultimately be sold or the notes liquidated from the earnings of the company, which, with revival of the steel business, promise to be large."

It is understood that the Republic Iron & Steel Co. will complete its new plant at Youngstown, O., in the shortest time possible. An official of the company has been quoted as estimating that by the end of the first half of next year the new rail mill will be ready for operation. The mill will have a capacity of from 20,000 to 30,000 tons per month.

New Find in the Baraboo District.

The Pittsburg Steel Co., of Pittsburg, which has been doing exploring in the Baraboo iron ore district, Sauk county, Wis., for the past year, has struck a rich body of ore about three miles from Baraboo and is preparing to sink a shaft. The find is about seven miles northeast of the Illinois mine, which is the best known property in this district. The company has nearly 2,000 acres under lease. Emil Winter and Willis J. McCook, the former president and the latter director of the Pittsburg Steel Co., are in the Baraboo district supervising the work. The place where the shaft is to be sunk is one mile from the main line of the Chicago & Northwestern railroad. This company at present has no furnaces of its own, but no doubt will erect one or two stacks if the ore proves to be of the desired grade.

Seventy-five prominent civil engineers of Great Britain, members of the Institution of Civil Engineers, are attending the international engineering congress at St. Louis this week. They were in Chicago last week. Engineering works of Chicago were visited, following a luncheon tendered by the Engineers' Club, some members of the party taking a trip on the Chicago river while others entered the tunnel of the Illinois Tunnel Co. and took a trolley trip to the work on the lake front. The plant of the Illinois Steel Co. and other places of interest were also visited.

The Norton & Cole Machinery Co., Cincinnati, O., has assigned. Assets $25,000, liabilities $32,000. The company has a plant at Norwood.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Toledo Metal Furniture Co., Toledo, O., has been incorporated with a capital of $60,000. Incorporators are: Adam Schauss, Benedict Uhl, C. R. Uhl and Charles Schauss.

The Fuel Saving Co., Utica, N. Y., which controls the Smith patent blast for use in furnaces and steam boilers, has been incorporated for the manufacture and sale of the fuel saving machines, systems of ventilating and heating apparatus. The capital stock of the new company is $30,000. Directors are: Solomon F. Smith and Fred O. Potter, of Waterford; William C. Markham, of Rush, N. Y., and John B. McMillan and Charles S. Gibson, of Utica.

The Grant Nail & Supply Co., Boston, Mass., has been incorporated with a capital of $50,000. President, R. L. Foster; treasurer, A. S. Aborn.

The Michigan Gas Machine Co., Berrien Springs, Mich., has been incorporated with a capital of $10,000, of which $7,500 is paid in.

The Toledo Tool & Stamping Co., Toledo, O., has been incorporated with a capital of $10,000. Incorporators are: C. W. Roshong, L. Banroth, J. Huefner, F. H. Foster, F. H. Ensinger, F. A. Banroth, and F. E. Banroth.

The Wire Goods Mfg. Co., Oklahoma, Okla., has been incorporated with a capital stock of $30,000. The incorporators are: F. M. Gault, J. H. Hess and R. H. Wilkin.

The Bay View Foundry Co., Sandusky, O., has been incorporated with a capital of $10,000. The incorporators are: Adam W. Link, James M. Crane, A. C. Kinzman, Sidney Frohman and George A. Blackford.

The new tools which will be required by the Lorain Steel Co., of Philadelphia, in equipping the extension to its plant at Johnstown, Pa., will be seven electric motors, ranging from 10 to 30 h. p.

A drill press, lathe and planer and steel hammer will be required by the recently incorporated Galena Iron Works Co., Galena, Ill.

The Philadelphia Rapid Transit Co. will soon be in the market for a complete machine shop equipment. The contract for a new building has just been awarded.

Woodward, Wright & Co., Ltd., New Orleans, La., have received estimates for the construction of the proposed new dry dock in that city. Machinery to the amount of about $12,000 will be purchased.

Fires and Accidents:—

An explosion on the morning of Oct. 2 of a tubular boiler of the Franklin Iron Works, Port Carbon, Pa., where heavy colliery machinery is manufactured, killed the engineer and blew the entire plant to pieces. The origin of the explosion is unknown, but it is said the boiler was defective.

The main building of the Standard Wheel Co., Memphis, Tenn., was destroyed by fire Oct. 4. The damage was about $12,000, covered by insurance.

Fire at the Empire Steel & Iron Works, Greensboro, N. C., Oct. 2, resulted in partly destroying the plant. Loss, $5,000 with no insurance.

Three men were fatally and three others seriously burned Oct. 7 by the explosion of a steam pipe in the mills of the Republic Iron & Steel Co. at Hammond, Ind.

As a result of the boiling over of a tub of molten slag at the Wharton furnaces, Wharton, N. J., Oct. 7, one man was burned to death and three others were terribly injured.

New Construction:—

The fire at the plant of the Chippewa Engine Works, Sault Ste. Marie, Mich., was a serious one, but the company has commenced rebuilding its machine shop and expects to have it in operation within two or three weeks. The shop will be better equipped and more commodious than ever. The company contemplates the erection of a foundry, plans for which have been drawn. The building will be built early in the spring. Connected with the company is N. O. Flodin, who has for a number of years been with the Lake Shore Engine Works, and has an excellent reputation in his line. The company expects to have the foundry in readiness by July or August and will be able to turn out both brass and iron castings. The machine shop will be a model one and will cater not only to the manufacture and repair of gasoline engines but everything in the line of heavy forgings and marine repairs. The officers of the company are: C. W. Baldwin, president; Simon J. Johnston, vice president and treasurer, and F. H. Hoard, secretary and general manager. Mr. Flodin will have entire charge of the foundry, drafting and pattern shop.

The American Sheet & Tin Plate Co. has ordered improvements amounting to $10,000 to be made to its plant at Anderson, Ind. A change is to be made which will permit the use of coal instead of gas. The plant has been shut down since Aug. 1.

The H. Wetter Mfg. Co., South Pittsburg, Tenn., has let the contract to Dunwoody Bros. for the erection of a building 56 x 120 ft., to be equipped as stove works; cost of building and machinery will be $30,000.

A pattern shop and pattern storage shop are to be built by the Babcock & Wilcox Boiler Works at Bayonne, N. J.

The Lake Superior Corporation, Sault Ste. Marie, Ont., advises us that it has not yet given any definite consideration to the question of building a coke plant.

The fire which occurred on the night of Sept. 11 at the plant of the Consolidated Wagon & Machine Co., at Idaho Falls, Idaho, destroyed the walls of a building whose erection had been commenced a short time before and the only salvage in the building was in the foundation. A new building is now being erected, which will be about 140 feet square, two stories and basement, bounded on three sides by streets, and should the weather be favorable, the plant will be under cover before the close of the present year, although the interior will not be complete by that time.

The Sturgess Governor Engineering Co., manufacturer of water wheel governors, variable rope transmissions and high-speed air pumps, Watervliet, N. Y., is making extensions to its plant.

The main building of the Muskegon Steel Boat Co., Muskegon, Mich., which will be constructed entirely of steel, will be 120 by 60 feet and will be built with runways to accommodate a 35-ton electric crane. The company is incorporated with a capital of $50,000, of which $25,000 has been paid in. The structural work is being erected by the Bellefontaine Bridge & Iron Co., of Bellefontaine, O.

Excavating for the new plant of Taylor & Lowell, at Janesville, Wis., has been commenced. The structure will be 64 feet square and wire fencing and similar products will be manufactured.

J. J. Anderson, of Milwaukee, Wis., representing a steel company, appeared before the chamber of commerce of Tacoma, Wash., recently and submitted a plan for a $90,000 steel plant, which his principals were willing to locate in Tacoma providing the city would contribute $30,000 of the capital invested. The proposition was accepted and Anderson left for the East to arrange for the construction of the plant.

The Buffalo & Susquehanna Railroad Co., of Buffalo, N. Y., will build a new machine, boiler and blacksmith shop at Galeton, Pa. The main building is to be 175 by 65 feet. The contract for the structure was awarded to the McClintic-Marshall Construction Co.

Work on the new machine shop of Greenlee Bros. & Co., at Rockford, Ill., has been practically completed and the moving of the equipment from the Chicago plant has been started. With the opening of the new machine shop, the company will have located in Rockford three departments of its works: the tool shop, machine shop and blacksmith shop. A foundry and small blacksmith shop will remain in Chicago for a time, but will ultimately be moved to Rockford.

The Otis Elevator Co. will build a plant at Houston, Tex., but the company states that it is not now ready to give any details concerning the new plant.

The contract for the building of the plant of the Fort Worth Rolling Mill Co., Fort Worth, Tex., has been awarded, and as soon as it is completed the machinery will be moved from the plant of the Standard Bolt Mfg. Co., of Alliance, O. The structure will be ready for occupancy not later than Dec. 1, and will employ between 400 and 500 men. W. K. Fogg, of Alliance, is president of the company.

The Stewart Iron Works, Covington, Ky., will erect an ad-

dition 75 x 100 ft., two stories. No equipment will be purchased.

Edgar B. Seidel, Waterbury, Conn., is building an addition to his crucible works in that city. The new building is 32 x 80 ft., two stories. As soon as the improvements are completed the business will be incorporated.

The Bartlett-Tewksbury Machinery Mfg. Co., Birmingham, Ala., will build an addition to its plant. The company manufacturers steam engines and saw mill machinery. The officers are: T. E. E. Bartlett, president; I. F. Young, vice president; J. W. Tewksbury, secretary and treasurer.

The Galena Iron Works Co., Galena, Ill., will erect a new building 30 x 80 ft. A drill press, lathe and planer and steel hammer will be required.

W. E. Jamieson, St. Joseph, Mo., will erect a building suitable for a modern machine shop, which he will conduct with his two sons. Mr. Jamieson was formerly a member of the firm of Jamieson-Combe Iron Works.

A plant, 50 x 90 ft., on Marietta street, Atlanta, Ga., has been erected by the Vulcan Foundry & Iron Works, recently incorporated.

Architects have plans for a plant for the Red Jacket Mfg. Co., Davenport, Ia. There will be a foundry, 85 x 200 ft.; machine shop, 82 x 200 ft.; rattling room, 40 x 80 ft.; power house, 32 x 40 ft.; pattern vault, 40 x 60 ft.

Work has begun on a $16,000 building for the Diamond Iron Works, at 1728 Second street N., Minneapolis, Minn. The building will be brick and stone, two stories, and will be used for the company's offices, pattern shop and warehouse.

General Industrial Notes:—

The Ball Engine Co., Erie, Pa., has an order for two 1,000-horsepower horizontal cross compound Corliss engines, direct connected to alternators, for the People's Ice, Light & Storage Co., of McKeesport, Pa.

The C. O. Bartlett & Snow Co., Cleveland, reports the following recent sales: One Triumph steam dryer each to the Buckeye Reduction Co., Findlay, O., S. Mendelson, Elyria, O., and Binns Stucco Retarder Co., Uhrichsville, O.; D. H. Grandin, Jamestown, N. Y., belt conveyor and other machinery; Ohio Sand Co., Conneaut, O., elevating and conveying machinery; Crown Dryer Co., Cleveland, O., elevating and conveying machinery; I. E. Boomer, Detroit, Mich, one Triumph gravel excavator and digger; Lowe Bros., Dayton, O., four special paint machines with motor drives; Magollon Gold and Copper Co., Cooney, N. M., special grading machinery; Jas. W. Ellsworth & Co., Cleveland, coal elevating and conveying machinery.

Three of the furnaces to be built by the Midvale Steel Works for use in the manufacture of armor plate have been completed, and gas was turned into them last week. The first steel was made with apparently satisfactory results. The ordnance department of the navy is about ready to ask for bids for additional armor plate and if the Midvale company enters the field, it will have to do so on the strength of the tests made in a small way of its new process, the Government also being satisfied with the assurance given by the company that by its secret process it will produce material of any thickness that will stand the test prescribed for Kruppized or Harveyized armor plate.

The Republic Iron & Steel Co. is operating two of its furnaces at Thomas, Ala., and is making sufficient coke to keep them going. Preparations to start the third furnace are under way.

The Consolidated Mfg. Co., Toledo, O., has acquired the plant of the Yost Mfg. Co., which will be used for the manufacture of a new gasoline touring car. At a recent meeting of the company the following officers were elected: E. T. Breckenridge, president; Ezra Kirk, vice president; A. W. Colter, secretary, and J. B. R. Ransom, treasurer. These officers and E. W. Tolerton constitute the board of directors.

The new plant of the Gartland Foundry Co., Terre Haute, Ind., has been completed and castings are being made. About 100 men are employed.

When the whistle of the Stilwell-Bierce & Smith-Vaile plant, Dayton, O., was blown on the last day of September, notifying the men that the work of the day was over, it sounded the knell of the company so far as the old name is concerned. There was no work done in the plant Saturday, Oct. 1, and work was resumed Monday, Oct. 3, under the name of the Platt Iron Works. One day's work was dropped to mark the passing of the old and the advent of the new. The new company starts under auspicious circumstances.

The Cataract Machine & Automobile Co., Niagara Falls, N. Y., recently incorporated, will do general machine work, making a specialty of automobile repairing and adjusting. It is located in the old Central Machine Co.'s shops. The officers are as follows: H. W. Kellogg, president; F. V. Simpson, vice president; W. A. Scott, secretary, and Max Amberg, treasurer.

Robert S. Armstrong & Bro., Atlanta, Ga., iron brokers and dealers in second-hand machinery, have moved into their new building on Marietta street. They contemplate erecting another building in the near future.

The Davenport Locomotive Works, Davenport, Ia., have secured a contract for two locomotives for shipment to the San Juan Sugar Corporation, State of Vera Cruz, Mexico.

The Acme Wire Co., Cuyahoga Falls, O., manufacturer of bright tinned and coppered market wire, spring wire and mattress and broom wire, has acquired the property of the Cuyahoga Wire Fence Co., including rod mill, coarse and fine wire mills, and is preparing to operate the plant to its full capacity. The company is making extensive changes in its equipment and expects to be in operation not later than Dec. 1 with a full line of its products.

The Rebecca furnace of the Kittanning Iron & Steel Mfg. Co., Kittanning, Pa., which has been idle for three months, undergoing extensive repairs, was blown in this week. The stack was relined, a new top was put into place, and coke bins were erected. The company's coke ovens have been torn out to provide additional yard capacity.

The Greenville, Pa., plant of the Shelby Steel Tube Co., Pittsburg, resumed operations after a three months' shut down. Additional machinery has been installed for the manufacture of seamless tubing.

The Pittsburg Construction Co., Pittsburg, has been awarded a contract by the Pennsylvania railroad for the erection of three new structures in Pittsburg. The power plant and repair shops will be of steel construction, while the Pullman building will be of stone and brick.

The Shenango mill of the American Sheet & Tin Plate Co., New Castle, Pa., which was idle last week on account of lack of orders, resumed operations this week in full. The company's Monongahela tin plate plant at Pittsburg also resumed operations this week after an extended idleness. Repairs were made to the continuous tin rolling machinery.

Three additional open-hearth furnaces of the South Sharon, Pa., plant of the Carnegie Steel Co. resumed operations this week. Four of the twelve furnaces have been in operation about two weeks.

A 50-ft. addition will be erected to the South Sharon sheet mill of the American Sheet & Tin Plate Co., South Sharon, Pa. At this plant a continuous sheet mill is being installed, which will probably be placed in operation the first of the year. The American Bridge Co. has the contract for the steel work.

After an idleness of two weeks the North Works of the Carnegie Steel Co., Sharon, Pa., resumed operations this week. The blooming and skelp mills are on in full.

The National Enameling & Stamping Co., Granite City. Ill., is converting three of its tin mills into two sheet mills and in the near future three additional tin mills will be changed into mills for rolling sheets.

The projectile plant of the Firth-Sterling Steel Co., McKeesport, Pa., is being enlarged by an addition 112 x 22 ft. A large amount of electrical machinery is to be installed and the projectile producing capacity will be greatly increased. This company has heavy orders for projectiles on its books due to the Russian and Japanese war, and effort is being made to hurry the addition to the plant to completion.

Five molders employed at the Scottdale, Pa., plant of the United States Cast Iron Pipe & Foundry Co. were badly burned last week as the result of an explosion resulting from dropping the bottom of the cupola into a bed of water accumulated underneath.

The Vancouver Pipe & Foundry Co. has been organized with a capital of $10,000 to take over the business of Wharton & Grey, of Vancouver, B. C.

DRY STEAM FOR ENGINES

The clearance space of an engine cylinder will take care of a certain amount of water without damage to the engine. But it cannot take care of large flushes of water due to foaming or priming boilers. That is the function of the Cochrane Steam Separators. They will successfully handle any quantity of water up to the quantity which the trap or other drainage system can carry away—plus the storage capacity of the well of the separator.

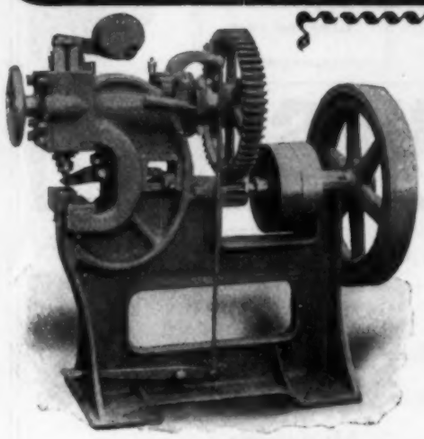
But these Cochrane Separators also have another duty almost equally important—that of taking small quantities of water or moisture out of the steam in order to give the user the economic value of dry steam. The more water there is in the cylinder at the end of the stroke, the more heat will be stolen from the cylinder walls, and therefore more heat must be taken from the live steam at the beginning of the following stroke to reheat the cylinder walls. By supplying dry steam to the engine the Cochrane Steam Separator reduces to a minimum the quantity of water in the cylinders, preventing unnecessary waste of heat and saving coal and money for the user.

These Cochrane Separators are built in thoroughly good fashion, being well designed and well constructed with first-class materials and workmanship. They have an enviable reputation for efficiency and a record of more than 10,000 separators in present satisfactory service. If you are interested in separators for *any* service, remember the name "Cochrane."

We will send you a copy of our complete Separator catalogue, H-S, if you wish.

HARRISON SAFETY BOILER WORKS, Clearfield & 17th Sts., Philadelphia, Pa.

Manufacturers of Cochrane Feed Water Heaters, Cochrane Steam and Oil Separators and the Sorge-Cochrane Systems.



6" throat only
Capacity, ½" hole through ½" plate

"Cleveland" Solid Frame Punches

With Universal Die Block
Adjustable Punch and Die Holder
Improved Automatic Stop
Shearing Attachments
In stock for immediate delivery

The Cleveland Punch & Shear Works Co.
CLEVELAND, OHIO
M'frs "Cleveland" Punches, Shears, Rolls, Plate Planers, Rotary Planers, Wall Radial Drills, etc.
PUNCHES AND DIES, ANY AND ALL STANDARDS
"Our Name Denotes Quality"

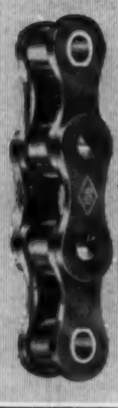
Universal Plates AND Plow Slabs.

Plates and bars 8 to 25 in. wide. Flat bars and skelp 4 in. and wider.

TACK PLATE, SHOVEL PLATE, STAMPING PLATE,
No. 16 and heavier by 16 in. wide and less.

Basic Pig Iron, Basic Open Hearth Steel Slabs, Sheet Bars,
Cut Nails, Pipe, Casing and Tubing.

LA BELLE IRON WORKS
STEUBENVILLE, OHIO.



DIAMOND CHAINS

A thoroughly well made steel chain, running on properly milled sprockets, will last much longer and prove much more efficient than a short belt. The truth of this statement is well demonstrated wherever feed belts have been replaced by chains

We solicit correspondence concerning the manufacture of chains for special purposes

FEDERAL MANUFACTURING CO., Indianapolis

A SINGLE MACHINE

may be all you want just now. Send in your order — it will receive the same prompt attention as a larger one.

WIRE MILL
CHAIN FACTORIES

A COMPLETE INSTALLATION

the whole thing from A to Z may be your need. We will furnish you an equipment unequalled anywhere.

1856 Nearly 50 years' experience behind our goods **1904**

Write for prices, stating capacity wanted

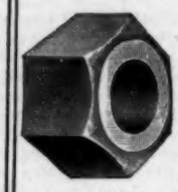
THE TURNER, VAUGHN & TAYLOR COMPANY

Cuyahoga Falls, O., U. S. A.

HOT PRESSED

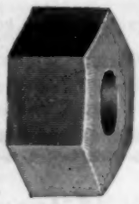
"MILTON"

COLD PUNCHED



Made of double refined bar iron, well finished and every one true to size. That's one reason why you should try these nuts, and then—

NUTS



The price will interest you

& WASHERS

"MILTON" brand are made from bars rolled especially for the purpose, and are true to gauge THEY WEAR INDEFINITELY

The Milton Mfg. Co.
Milton, Pa.

AMERICAN STEEL HOOP COMPANY

GENERAL SALES OFFICES:
CARNEGIE BUILDING, PITTSBURGH, PA.

DISTRICT SALES OFFICES:

ATLANTA:	Equitable Building
BOSTON:	Telephone Building
BUFFALO:	German Insurance Building
CHICAGO:	The Rookery
CINCINNATI:	Union Trust Building
CLEVELAND:	Perry-Payne Building
DENVER:	101, 102 Boston Building
DETROIT:	Union Trust Building
NEW YORK:	Empire Building
PHILADELPHIA:	Harrison Building
SAN FRANCISCO:	226 Market Street
ST. LOUIS:	New Bank of Commerce Building
WASHINGTON:	Nat'l Safe Deposit Building
ST. PAUL:	Pioneer Press Building
NEW ORLEANS:	Hennen Building

FOREIGN SALES OFFICES:

CITY OF MEXICO:	924 Apartado
MONTREAL, CANADA:	Bell Telephone Building
SYDNEY, N. S. W.:	Mutual Life Bldg., 14 Martin Place